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Improving product sales and marketing practices for petrochemical project engineering

Helsinki Metropolia University of Applied Sciences

Master's Degree

Business Informatics

Master's Thesis

11.10.2015

Helsinki Metropolia University of Applied Sciences

Author(s) Title Number of Pages Date	Sari Aronen Improving product sales and marketing practices for petrochemical project engineering 64 pages + 16 appendices (20 pages) 11.10.2015
Degree	Master in Engineering
Degree Programme	Business Informatics
Instructor(s)	Thomas Rohweder, Principal Lecturer, Dr (Econ)

The purpose of the thesis is to build a proposal for improved product marketing practices for case company's business segment, operating in petrochemical project engineering. The case company is a global supplier of technologies and services to a range of process industries around the world. Case company has the challenge of delivering the correct sales & marketing message to the customers in the early stages of the plant engineering process, prior to official purchasing decision. This applies particularly to the selected product group subject to this study.

The selected research approaches are action research to obtain clear perspective and depth of key-stakeholders' values and beliefs about the topics presented, archival research to describe and define the customer plant project stages and literature review to discover the best practices for product marketing in industrial business.

The outcome of the study is a proposal for improved model for product group sales and marketing practices for the early stages of customer petrochemical project engineering. The research process combines the customer plant project steps with findings from the best practices of industrial buying process for product group sales and marketing practices.

The case company may benefit from the results by implementing the practices to project sales process, improving customer reach with the product group for projects and applying the model to other product groups supplied to project business.

Keywords	Product marketing, project engineering, buying process

Tekijä Työn nimi Sivumäärä Päivämäärä	Sari Aronen Improving product sales and marketing practices for petrochemical project engineering 64 sivua + 16 liitettä (20 sivua) 11.10.2015
Tutkinto	Master in Engineering
Koulutusohjelma	Business Informatics
Työn ohjaaja	Thomas Rohweder, KTT

Opinnäytetyön tarkoituksena on parantaa kohdeyrityksen tuoteryhmän markkinointikäytäntöjä projektisuunnittelussa petrokemian teollisuudessa. Kohdeyritys on maailmanlaajuinen teknologisten tuotteiden ja palveluiden toimittaja useille prosessiteollisuuden aloille. Kohdeyrityksen haasteena on tavoittaa asiakkaat tarkoituksenmukaisilla myynti- ja markkinointikäytännöillä laitosprojektin sunnittelun alkuvaiheissa ennen ostopäätöstä. Haaste liittyy erityisesti tutkimuksen kohteena olevaan tuoteryhmään.

Toimintatutkimus valittiin tutkimusmenetelmäksi, jotta saadaan selkeä kuva ja syvyys avainsidosryhmien arvoista ja käsityksistä valitussa viitekehyksessä. Arkistotutkimus valittiin toiseksi tutkimusmenetelmäksi asiakkaan prosessilaitoksen suunnitteluvaiheiden kuvaamiseksi ja määrittämiseksi. Kolmatta tutkimusmenetelmää, kirjallisuustarkastelua käytettiin parhaimpien tuotemarkkinointikäytäntöjen selvittämiseksi teollisessa liiketoimintaympäristössä.

Tutkimuksen tulos on esitys mallista, jolla voidaan parantaa valitun tuoteryhmän myynti- ja markkinointikäytäntöjä petrokemian prosessilaitoksen projektisuunnittelun varhaisissa vaiheissa. Tutkimusprosessissa yhdistyvät asiakkaan prosessilaitoksen suunnitteluvaiheet teollisen ostoprosessin parhaimpiin käytäntöihin valitun tuoteryhmän myynti- ja markkinointitoimenpiteissä.

Kohdeyritys voi hyötyä tutkimuksen tuloksista ottamalla käytännöt osaksi projektiliiketoimintaprosessia, tavoittamalla projektiasiakkaat paremmin tuoteryhmän markkinoinnissa ja soveltamalla käytäntöjä muihin kohdeyrityksen tuoteryhmiin.

Avainsanat	Tuotemarkkinointi, projektisuunnittelu, ostoprosessi

PREFACE

At the beginning of the studies at Metropolia University of Applied Sciences, we were asked to explore the business challenges of the organization to which we were going to conduct the study for. It had been recognized at the case company for some time already the challenges within project business and the fierce competition within the studied product group supplied for that business environment. After exploring some alternative topics around the issues and discussing those with experienced people in the case company, the topic finally found its form.

The selected research topic was challenging, and it offered a great opportunity to learn about project engineering and business to business sales and marketing practices. It was a pleasure to explore this topic together with great professionals at the case company and with my thesis instructor, Dr. Thomas Rohweder. I would therefore like to thank all participants for their commitment to this study and giving me the opportunity to examine this appealing business problem. I would further like to thank Thomas for his advices, support and motivation to me to compact the message of this vast topic area into bits and pieces that in the end found their places in the final proposal.

This journey offered a great opportunity for personal growth by showing how important it is to utilize the organizations knowledge and potential in solving business challenges and to be persistent during the study even though the goal sometimes seemed to be going further off.

Last, but definitely not least I would like to thank my husband Jari for all his support during this journey by spurring me forward and taking care of the household practical issues. I would like to give a big hug for my daughter Saana for being so patient to let her mom to spend months for writing this research project.

Sari Aronen
Porvoo, 11.10.2015

Contents

1 Introduction

The purpose of this study is to build a proposal for improved product marketing practises for case company's business segment in petrochemical project business. This section introduces the case company, the business environment, the business problem studied and the scope of the study.

1.1 Context

The case company is a global supplier of technology and services to a range of process industries around the world. The core customer industries are mining, construction, and oil and gas. The company also serves customers in the pulp, paper and power industries with leading product and service solutions. 16 000 industry experts is located in more than 50 countries worldwide working in close cooperation with customers to achieve sustainable process and profit improvements in minerals processing and flow control.

The business segment's core customer industries are oil & gas, and pulp and paper. There is also an increasing focus on mining and construction and power generation, with a broad set of capabilities globally and across a wide spectrum of other process industries. Services account for about half of the business. Business segment's product and services is supported by a worldwide network of more than 1 000 experts and 35 product service centres.

The sales are made through direct sales channels, representatives and distributors with service presence in areas with major end customers and engineering, procurement and construction (EPC) companies. Product technology and supply centres are located in Finland, the US, Germany, China, South Korea, India and Brazil.

EPC-contracting is a common practise in petrochemical industry when building new process plants or revamping an existing plant. EPC stands for Engineering, Construction and Procurement. As described by The Engineering, Procurement and Construction Portal, the engineering and construction contractor will carry out the detailed engineering design of the project, procure all the equipment and materials necessary and construct to deliver a functioning facility to their clients, referred to as plant

owners. Companies that deliver EPC projects are commonly referred to as EPC contractors. EPC-project comprises of several stages or phases starting from feasibility studies, basic engineering and execution. There exist also several types of contracting strategies between the EPC contractor and plant owner. The purpose of the contracting strategy is to agree the responsibilities of cost, schedule and budget, services provided and project contract, advice and interface management between EPC contractor, plant owner and main material suppliers also referred to as vendors.

1.2 Business challenge, objective and outcome

This chapter describes the identified business challenge, the objective of the study and the intended outcome of the study.

Business challenge

Oil and gas as a strategic growth industry for the case company consists of complex projects with different competitive environment, which makes it very challenging to market and sell competitive product solutions for customers involved in EPC-project engineering. The projects differ in size, scope, geographic location, EPC-contract type and product specifications and requirements for equipment vendors. It is therefore necessary to identify the most important steps required in product sales and marketing practices to be recognized in each project to be successful in product sales.

To succeed in selling primary equipment for the above described plant projects requires marketing action from vendors early on in the plant engineering process, clearly before the official purchase decision stage. Case company has the challenge of delivering the correct sales & marketing message to the customers in the early stages (prior to official purchasing decision) of the plant construction process. This is particularly important for selected product group, where these products and brand is not well recognized and known among customers. The impact of the issue is to achieve business line’s strategic target’s to exceed market growth rate, grow services business and reach company financial targets.

Objective

Given the above, the objective of this thesis is to propose a **model** for successful product group sales & marketing practices for the early stages of customer project engineering.

Intended outcome of the thesis

The output of the study will be to propose the above mentioned model that describes the product group sales and marketing practices to the customer in the early stages of the plant engineering process. This will answer the case company's project business challenges within product group in question and supports company's strategic product group sales targets.

1.3 Scope

The study involves specific product group with product types A and B. This product group has been selected as a strategic growth focus for the case company. Other product groups, accessories and spare parts are excluded from the study.

The sales and marketing channel involves global and local sales, business and product management teams, who are involved in sales activities related to project business within specific product group. The geographic market focus is global, comprising of four major regions: North America, South America, EMEA (Europe, Middle-East and Africa) and Asia.

The industry focus in the study is petrochemical manufacturing, comprising products made from refined gaseous or liquid petroleum hydrocarbons such as petrochemicals, basic organic chemicals, plastics and resins, synthetic rubber, synthetic fibers and fertilizers. Customer focus is all significant stakeholders who are either direct buying customers or key-stakeholders having important role in product group type selection and buying process within petrochemical industry project-business and interacting with case company sales staff.

2 Research approach

This section describes the research design including the project plan that explains the main steps and what will be done at each step of the research project. Data collection and analysis methods section describes the methods used for the research.

2.1 Research process

This chapter presents the research process of the study. The research process follows six key linear steps. The study starts from identifying the business problem, which is also used as a basis to design the study process. The next step describes the project engineering stages and procurement practices in general and the pre-purchase stages in specific. The current status is analyzed within the identified project phases, followed by study of best practices and proposal for improved model. The proposal is then reviewed again with key-stakeholder feedback to form the final outcome of the study. Last step presents the final verified outcome of the study. Figure 1 presents the research process in this study.

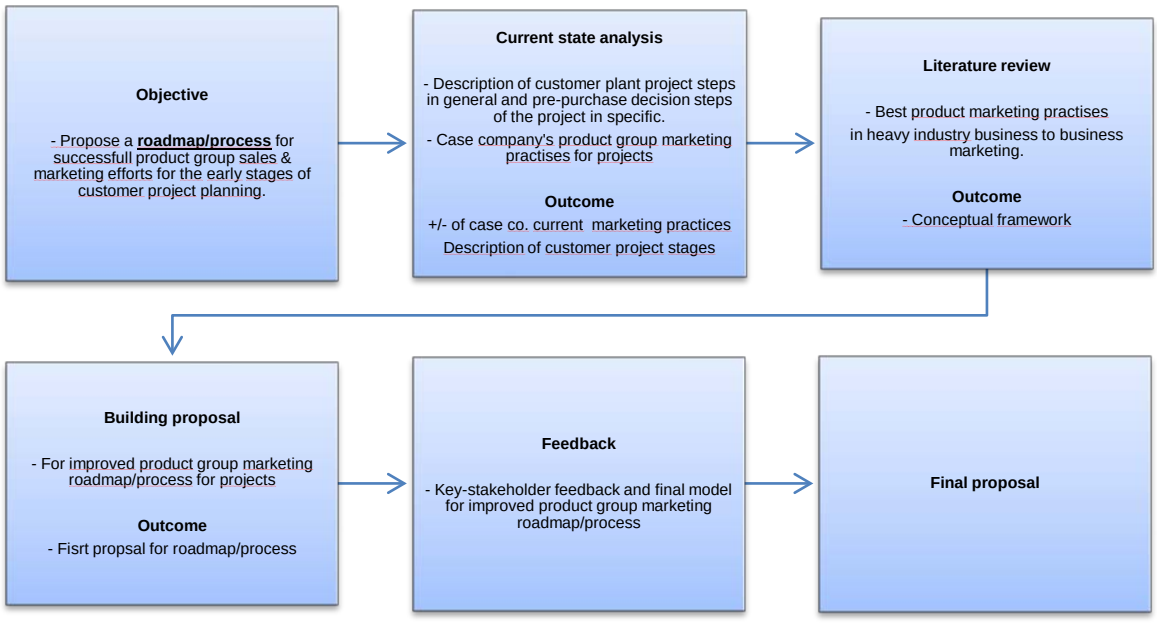

Figure 1. Research process in this study

The objective of this thesis was to propose a **model** for improved product group sales & marketing practices for the early stages of customer project engineering. The business problem identification relied on the discussions with key-stakeholders in the case company's organization and the researcher's own experience related to the field of the study within the organization.

In the current state analysis, the customer plant project engineering process was studied and described as a whole in general and pre-purchase decision process was studied and described with more in specific. This was data stage 1. The project engineering process was studied by using several data sources in public domain; project engineering companies own descriptions to be found on their websities, publications, articles and conference papers. The second part of the current state analysis involved case company's current product group marketing practices weakaness and strength analysis for the project engineering pre-decision process. This was data stage 2. This was studied by interviewing the key-stakeholders involved in project engineering business and product group sales and marketing. The outcome of the current state analysis was project engineering process description and case company product marketing practises strenghts and weakness in the described project business process.

Literature review part presents the best practices of product marketing to industrial construction projects. The data was collected from various sources in relevant academic literature, such as articles and books. The best practices in literature was focused on finding what is known about the subject and looking for existing theories and models created. Outcome was conceptual framework.

Building proposal presents improved product marketing practices for projects with focus on improving the weakness areas identified in current state analysis and combined with literature best practices. These new, proposed practices were embedded with the strengths identified in the current state analysis. The outcome was first proposal for the improved marketing practices for project engineering business in the case company's product group in question. The proposal was built with key-stakeholders and presented as a sales and marketing model.

In the final part the proposed sales and marketing practices was discussed with key-stakeholders. The feedback rounds were organized as interviews. The final sales and

marketing model was created based on the feedback. The concluded findings, next practical steps and managerial implication are outlined in the last section.

2.2 Data collection and analysis methods

The data collection methods used in this study was in-depth interviews and secondary data sources. This section describes how the data was collected and which way it was analyzed.

In qualitative research designs, in-depth interviews is a common method to collect information from organizational members. This helps discovering the views, perceptions and opinions through the language they use. (Easterby-Smith et al. 2012: 126)

The key-decisions in preparing for interviews is the structure of the interview. The interviews can be highly, semi- or unstructured. In less-structured interviews the researchers are suggested to make choices during the data collections about questions that should be explored further and which paths to discard. The researcher should be tied to frameworks or have some knowledge about the interview topic. In order to avoid too strict ties, a topic guide can be used as a loose structure for the questions. In order to produce a clear picture of the interviewee's perspective, the researcher should be directing the interview according to the pre-defined topics and also take care that the right questions are answered according to the exact areas of interest. The benefit of more open (semi- or unstructured) interview question is that it provides a higher degree of confidentiality, personality, inflection of voice and facial expressions. These aspects can be used in developing secondary questions. (Esterby-Smith et al. 2012: 127-128)

Open interview with secondary questions was the main method used in this study. It suits well for this type of study that has the focus on interviewing small number of key-stakeholders with the target of obtaining clear perspective and depth of interviewees' values and beliefs about the topics presented. Topic guides were used to create the predefined themes for the interviews. The framework and guides for the interview questions in current state analysis was built before the interviews during the description of customer plant project steps. The framework used for the second interviews with key-stakeholders when building the proposal for improved product sales and marketing model for projects were the best practices discovered in literature (conceptual framework).

Secondary data sources as a research method was applied to describe and define the customer plant project steps in general and the specific description of the pre-purchase decision steps. The method suits well for this purpose, since before the current state analysis, the researcher needs to have a clear understanding of how case company's interest groups are describing these steps. There is plenty of good quality data sources available in public domain, such as company reports, websites, blogs, articles and books. Secondary data is more distant from the research than data collected by the researcher for the study. Therefore, it is important to let the business problem to guide the collection of the secondary data.

The data collected was analyzed using content analysis. The purpose of content analysis is to organize the data into themes, groups and important findings. This can be done using a template analysis to search for themes in order to reveal patterns in the data. The list of codes can be decided before the analysis. In template analysis a code is a descriptive heading or label for text. The codes can be organized hierarchically to sub-codes. A checklist matrix might be useful. (Easterby-Smith et al. 2012: 165)

3 Current state analysis

The first part of this section describes the petrochemical project engineering stages in general with specific focus given in the pre-purchase decision steps. Secondly, the case company's current sales and marketing pre-purchase practises for project business are described followed by analysis of weaknesses and strengths of the product group current sales and marketing practises for project engineering pre-purchase stages.

3.1 Description of the customer plant project steps in general and of the pre-purchase decision steps of the project in specific

This part focuses on describing and defining new petrochemical plant project stages in general and the specific description of the pre-purchase decision steps. The data was collected from four major, international engineering, procurement and construction companies, (Chiyoda, Technip, Fluor and JGC) and one end-user/plant owner, (Shell).

The data was collected from these companies' public domains (company websites). The EPC engineer – The Engineering, Procurement and Construction Portal (www.epcengineer.com) was used as an additional data source. The data was collected between 21 and 28th March 2015.

The data was collected and organized to main themes as project stages by analyzing for data sources of repeating patterns of the EPC-projecting stages and main action points that could be identified and confirmed to be as common practices of project engineering process.

Three articles / studies were used as additional data sources to describe the detailed pre-purchase decision steps: 1) Contracting strategies in the oil and gas industry by C. Schramm et al, 2010, 2) Worlds Apart: EPC and EPCM Contracts: Risk issues and allocation by P. Loots and N. Henchie, 2007 and 3) How to share & manage risk between the owner & contractor on new petrochemical projects by D. Atzori, 2015.

3.1.1 General description of EPC-project stages

EPC-projecting consists of several stages from conceptual study, front end engineering design, detailed engineering, procurement, construction and commissioning to start-up. This section focuses on describing the project stages required in building new petrochemical plant. Operational, maintenance and de-commissioning stages are excluded from this study. According to Shell, it typically takes five years or more to build a petrochemical complex and actual time varies by project. Figure 2 presents the main EPC-project stages, approximate timeline and steps required developing a petrochemical facility from planning to start-up.

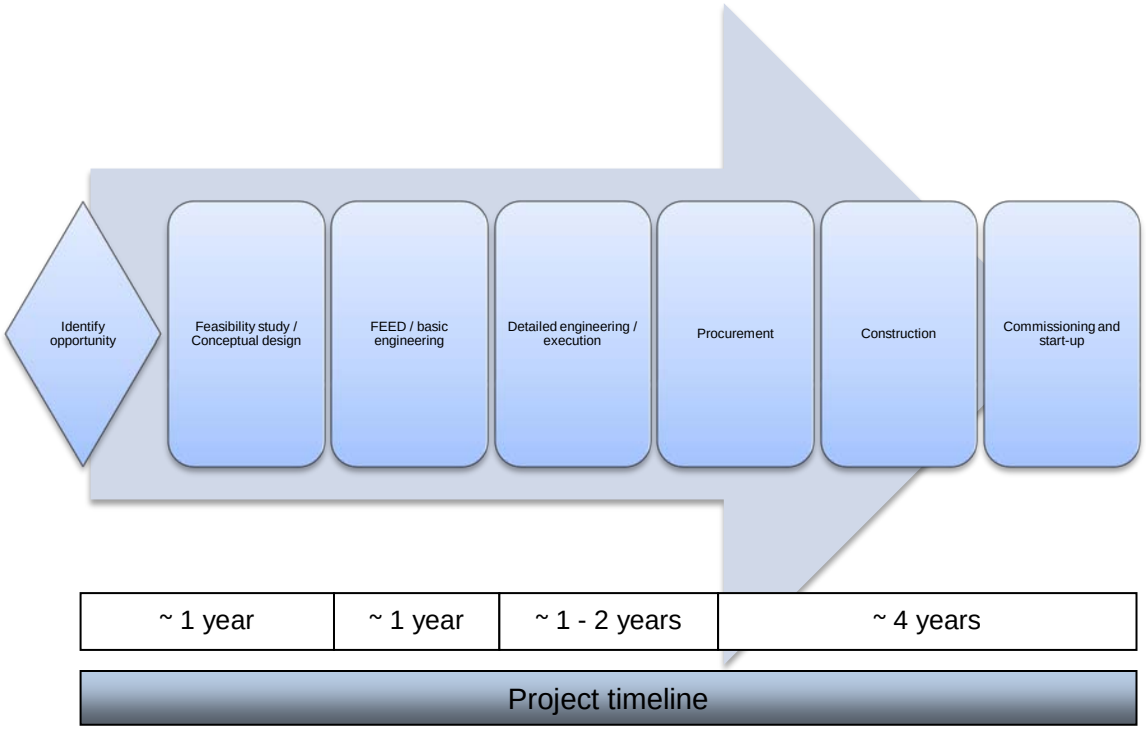

Figure 2. EPC-project stages and timeline

Identify opportunity

Before any facility investment plan starts, business plan is conducted. The objective is to define the business opportunity with technical assessments, investment plan schedule and cost estimations. The outcome of business planning is functional requirements and economic evaluations. (Baron 2015: 5)

Feasibility study

Every new petrochemical plant investment plan starts with a feasibility study, which is also called as a conceptual design. Feasibility studies are performed as a part of the initial stages of a project, to confirm profitability of the owner's investment plans. The feasibility studies typically include conducting surveys, gathering data, and analyses of the whole environment surrounding a project. This includes market surveys, policies, financials, legal requirements, tax obligations, the selection of the production processes and technologies, investigations of the optimum configuration for process utility equipment, calculations of equipment, and operating costs. Preliminary hazard and operability study (HAZOP) is included to examine the planned process or operation in order to identify and evaluate problems that may represent risks to personnel or equipment, or

prevent efficient plant operation. The feasibility study evaluates the project potential for success and it provides objective information upon which owners and investors can base their investment decisions.

FEED

FEED stands for front end engineering design which is conducted after the completion of the conceptual design or feasibility study. The FEED design focuses on the technical requirements and rough investment cost for the project. The FEED can be divided into separate packages covering different sections of the project. The FEED package is used as the basis for bidding the execution phase contracts and is used as the design basis to finalize technical project scope and adequate cost estimate. Some companies may call this phase as a basic engineering, which consists of the same practises as FEED. Vendors (such as case company) are sometimes asked to provide budgetary quotations, but not always. The FEED-contractors may use existing vendor budget price lists. The final plant investment decision is made at the end of the FEED.

Engineering

The engineering phase of the project is also known as the execution phase which follows the FEED phase. At this phase the project engineering companies are bidding and competing for the project packages, and vendors are preparing the first budgetary quotations to the engineering companies. The awarded engineering and construction contractor will carry out the detailed engineering design of the project, procure all the equipment and materials necessary, and then construct to deliver a functioning facility or asset to the plant owner. Companies that deliver EPC-projects are commonly referred to as EPC-contractors. Sometimes the same company can deliver both FEED- and EPC -engineering. If the project is large, there are several EPC-contractors involved. During the procurement the vendors are preparing detailed quotations to the selected engineering company for the project package in question.

Procurement

The EPC-procurement -department connects engineering and construction by co-operating closely on projects. The procurement includes materials within the working budget of projects, production progress control after order, and quality control of

inspections and transportations to sites according to a project schedule. The procurement is in charge of sourcing new suppliers, buying, expediting orders, inspecting the manufacturing of equipment and bulk material as well as organizing delivery and logistics. Procurement offices are typically located around the world, with in-house resources to efficiently locate, evaluate, purchase and arrange for the transport of materials and services to any project site.

Construction

The construction processes comprises of underground and aboveground structure framing, piping, equipment installation, electric and instrument system setup, painting, insulation and all other construction work. The project involves thousands of workers from different cultures and nationalities utilizing construction equipment, components and installing them at site. The site locations can be located in different regions from extreme cold to desert heat. Local construction codes and all site standards and regulations for labour, environment, safety and health created by authorities and national oil companies has to be followed carefully during all operations.

Commissioning

Commissioning is performed before plant commercial operation after completion of construction of the plant. Initiated right from the beginning of design phase, commissioning and start-up activity aims to validate if the equipment in plant operates in accordance with design and project specification. Startup success requires a team approach with active planning and participation by all stakeholders from owner, engineering, process licensors (if applicable), suppliers, construction, and the start-up team. Deep knowledge and analysis skill are required for the trouble shooting during commissioning and start-up. Completion of a well-designed and safe facility delivered on time requires the early development of a commissioning and start-up plan and schedule.

3.1.2 Specific description of pre-purchase decision steps

The purpose of this chapter is to describe specifically the relevant pre-purchase decisions steps in petrochemical plant EPC-project for a valve vendor. Product type selections starts at the FEED/basic engineering stage. The contracting types and

strategies will be discussed as well, since those decisions will be made at an early project stage.

Feasibility

In the case of an end-user company planning to progress into a new business, engineering companies provide a conceptual design, giving a picture of the general form of that business, and based on that, carries out a feasibility study. Feasibility studies are usually performed in several stages, with the precision of investigation increasing step-by-step, until development as a business is finally decided, if it is judged that this will yield high profitability. The study is supported by the use of modeling and simulation tools, such as computational fluid dynamics modeling (CFD). According to Fluor, the conceptual design phase offers the best opportunity to assess business, commercial and technical risks and it improves return on investment.

Feasibility study typically starts with a market survey, production process is selected, the optimum configuration for process utility equipment is investigated, and equipment, maintenance and operating costs are calculated. The outcome is an optimized, economical proposal that considers the entire plant lifecycle.

Chiyoda describes the following special characteristics of their feasibility studies:

- Propose a process selection and optimum equipment configuration that meets the needs of the customer
- Give a highly accurate estimate of construction costs based on data from an extensive record of achievement in construction projects
- Provide an efficient investigation supported by engineers of long experience and a rich fund of data
- Process development support
- In commercial plants, well-timed commercialization, optimum scale of commercial production, minimization of manufacturing costs, efficient production of high quality products and high reliability
- Analysis technology developed and implemented for more efficient commercialization support methods known as “Scale-up engineering”

FEED

Front-end engineering and design (FEED) consists of actual engineering work according to the specifications set out in the business plan outlined in the feasibility study (plant capacity, facilities configuration, etc.). FEED is defined as the work required to produce process and engineering documentation of sufficient quality and depth to adequately define the project requirements for detailed engineering, procurement and construction of facilities and to support a ±10 percent project cost estimate (Fluor). The main purpose of FEED is to create a full set of technological specification documents, called a FEED package, defined by the plant owner. 60-70% of project costs are decided in FEED (JGC).

Fluor summarizes that this project phase is typically used to:

- Evaluate options that will improve the return on assets
- Conduct hazardous operations reviews
- Support internal funding requirements
- Develop the engineering design packages that can be used to bid a lump sum EPC scope and / or provide the foundation for the detailed engineering phase
- Prepare cost estimates for scope definition and for project funding

At this stage the engineering companies are working closely with process licensors, either in-house or external. A successful FEED will reflect all the plant owner's project specific requirements and avoid significant changes during the execution phase. Close communication between project owners, operators and the engineering contractor is important to work up the project specific requirements. The FEED phase takes about one year in case of large sized petrochemical project.

Engineering companies executing the FEED are using specific FEED-design tools in order to determine optimal process flow and deliver a FEED package that meets plant owner's needs with regard to operations, safety, and the environment. Proprietary tools involve for example plot optimization and preliminary layout, used to evaluate design options for cost optimization of process plant facility designs and creation of conceptual 3D plant models with automated routing, equipment creation, and material quantity downloads.

During the basic engineering design the mechanical data sheets of the main equipment, starting from the process specifications are issued incorporating the specific requirements of codes and standards to be applied to the project in question. The FEED design includes the main piping, instrument, electrical and civil works layouts and instrument diagrams released for detail engineering. FEED includes also the preparation of tender packages for the main equipment and all the studies to be performed before ordering the main equipment.

Engineering, procurement and contracting

Petrochemical project complexity is increasing with size differences and many projects have intensive international involvement. This means that the challenges to meet the project objectives are increasing. Schramm at al. suggest in their study about oil & gas industry contracting strategies that the contracting strategy between the contractor and owner should take into account the desired allocation of risks, division of responsibilities, interfaces, market situation, splitting works between the parties and time constraints.

The selection of the contracting strategy is the key factor determining the whole project success. The link between the parties' involvement in a project, willingness to take risk and the selection on contracting strategy varies between the two extremes from mostly the owner to mostly with the contractor. (Schramm et al. 2010)

For equipment vendors, such as the case company, it is very important to identify the contracting type of the project, since it defines the main point of contacts and the business operating environment in global projects.

The most common way of contracting a petrochemical project is engineering, procurement and construction (EPC). Following the awarding the contract to the EPC contractor, all major communication, administration, costs and delivery times involving vendors are handled by the EPC-contactor, who acts as a single point of contact for the vendors (Schramm et al. 2010).

In an engineering, procurement and construction management (EPCM) contract, an engineering company provides engineering, procurement and construction management services. In this type of contract the EPCM contractor will assist the owner to

manage the whole project. The cost risk is borne and control is executed by the owner, and less by EPCM contractor. The EPCM contractor develops the design, executes the procurement process and manages all contracts and construction process. The contactor also assists in all negotiations to create the direct contractual relationships between the owner, construction contractors and major equipment suppliers. (Schramm et al. 2010)

Progressive lump sum contract is between the two extremes of EPC and EPCM contracts. This is based on a specific approach of remuneration, where the entire project is separated into pre-agreed stages awarded on a lump sum basis within the scope of an EPC contract. In this way, the entire EPC project is progressively adjusted for variations and changes in scope and extent, so the contract values are much closer to the actual costs. (Schramm et al. 2010)

Loots and Henchie discuss in their study that while the lump sum EPC contract option usually remains the most common procurement route for owners and funders, in the response to changing market conditions the EPC-contractors are increasingly looking for alternatives. Recently there has been an increase in cost reimbursable contracts with a target price mechanism built in. There has also been a significant increase for the EPCM contract procurement contracts for international infrastructure and construction works. (Loots and Henchie 2007)

This kind of changes in market conditions is important for equipment vendors to understand, since it defines the point of contacts and the type of purchasing behaviour of the project buyers.

In an EPC type contract the advantage from the owner's point of view is that the contactor takes full responsibility of cost, time of completion and the quality of the design. The disadvantage when compared to the EPCM type of contract is that the contactor is taking the rights for the detailed design of the plant. This means that the owner should take great care to specify and define the design parameters and the outcome so that the owner obtains the plant according to the required standard. For the EPC contractor, the challenge is to connect the interfaces between the FEED engineering and detailed engineering, when the EPC contractor did not execute the FEED itself. The solution to bridge these interfaces is to consider alternative contract strategies including EPCM,

which has the potential for providing the seamless and continuous responsibility for the engineering. (Loots and Henchie 2007)

D. Atzori has conducted an in-depth interview with leading personalities of the petrochemical industry, where he analyzed how owners of the petrochemical facilities and their contractors can manage the risk of cost escalations and schedule delays. In his report he indentifies some key-areas: risks related to the workforce availability, modular construction as way to control risks, increasing complexity of the large scale projects, allocating risks, aligning project expectations and coping with change.

It could be beneficial for equipment vendors to evaluate how to support project customers, both owners and contractors to manage the risk of cost escalations and schedule delays in the identified key-areas mentioned above.

During the negotiation, before dealing with commercial issues, it is vital to agree the technical scope. At that stage, everything from product design to the process conditions, the construction strategy and the handling of unforeseen events, needs to be considered. If those issues were recognized and used as a part of the FEED, the project would proceed more smoothly and the costs would be better controlled. EPC companies could prevent cost increases by trying to obtain fixed bid from major equipment supplier before submitting their final proposal to the customer. (Atzori 2015)

This is also important thing to consider for equipment vendors, how to help their customers to agree the technical scope with product design at the FEED stage. It might be then possible for vendors to give fixed bids that could help control the project costs, and thus lead to successful bids for the vendor.

3.2 Description of current sales and marketing practices in project engineering

This section describes the current sales and marketing practices and the sales process in EPC-project engineering. Figure 3 presented by the case company, summarizes the project stages, targets and main actions at each stage.

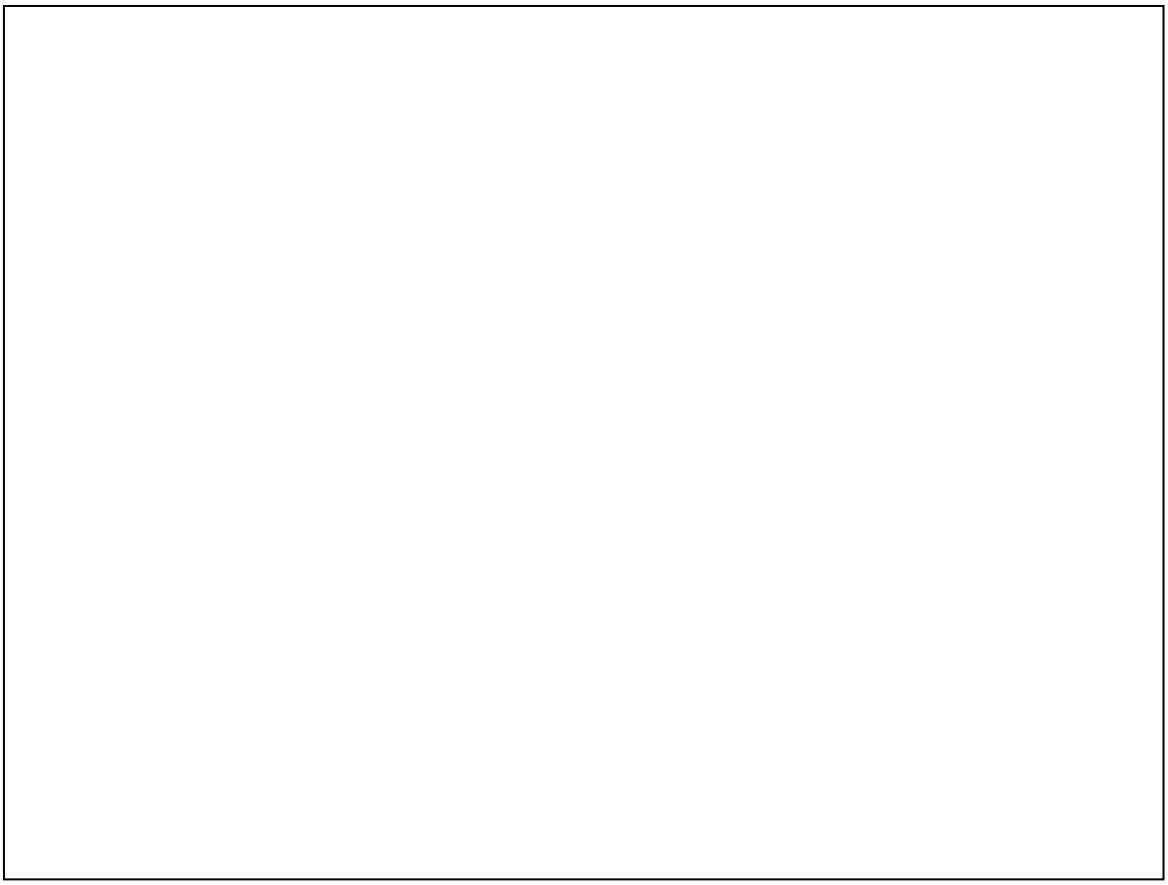

Figure 3: Project sales process described by case company

As can be seen in figure 3, in lead stage, the first information is received that there is a plan or decision made by end-user (owner) to invest in a project with an EPC-company involved in the project. The target for case company is to identify the type of project and initiate actions to get products approved for the project in question.

The lead is identified and actions are initiated either by local sales or global project sales management. The contacts to the end-user key-people are established. If the end-user is case company's key-account, the global key-account management is involved to coordinate actions and contact end-user. The first information is placed in sales database. End-user installed base and related references are reviewed. End-user drivers are investigated and project scope and investment schedule is identified.

Target for the case company at FEED and bidder's bid stages is to be vendor listed and well positioned for the project so that EPC's will select case company as one of the possible vendor's for the project bidding.

Bidder's bid is a point in EPC-projecting where equipment vendors are issuing quotes to several EPC-companies who are competing about the project engineering. In large, EPC-projects with several plants, this phase can be very complex, when vendors have to submit quotes about the same equipment package to several EPC-companies in different locations. The responsibility of the sales process management is with oil & gas FEED team in the FEED and bidders' bid phases.

Every EPC-project has a nominated Front End Project Manager (FEPM) at the FEED phase. His target is to make sure the very best position for case company when the project enters into the awarded phase. FEPM has full responsibility managing the project during the FEED and Bidders bid phase.

The target in awarded stage is to receive the request for quotation (RFQ), issue competitive quotation, ensure invitations to final negotiations and secure the order.

Awarded phase stands for the point in the EPC-project where the EPC-company has been awarded to perform the EPC-contracting for the job/plant in question. In the awarded phase, the case company sales responsibility is transferred to Sales Project Manager (SPM), nominated by Area sales head or by Global EPC team head, depending on the size of the project as soon as project is awarded to the selected EPC-contractor(s). SPM's target is to secure profitable project orders for future growth. SPM has full responsibility managing the project during the sales process.

Quotation process

All quotations made in FEED and Bidder´s bid are considered as budget quotations and made by global project quotation teams (PQT). Final quotations in awarded stage are made by local sales office. PQT supports awarded quotations in specific cases if required. PQT will support projects which are in line with case company's strategy. Exceptions are allowed with approval from project sales director level. During the final quotation process the finalized product and sales strategy is defined in sales database by Sales Project Manager and project team.

3.3 Analysis of the weaknesses and strengths of product marketing practices in project engineering

This section describes the weaknesses and strengths of product sales and marketing practises for engineering project pre-planning stages. The analysis is based on key-stakeholder interviews. The interviews took place at case company premises between 21st April and 27th April 2015. Four key-stakeholders were interviewed from global product group business and global project management. The framework for the interviews and discussed topics were identified in the first part of the current state analysis in section 3.1 EPC project stages and 3.2 case company current practises in EPC-project business. The framework is presented in appendix 1. The summary of interviews is presented in appendices 2 – 5.

The data was organized into themes, groups and important findings. This was done using a template analysis to search for themes in order to reveal patterns in the data. These themes created the main topics for weaknesses and strengths, which were further divided into sub-headings.

3.3.1 Product marketing weaknesses in project engineering

This chapter describes the weaknesses of product sales and marketing practises in project engineering stages. The analysis is based on key-stakeholder interviews. The main topics identified in current state analysis for weaknesses were sales project baseline issues, sales action timing, product offering, resourcing and sales tools.

Sales project baseline issues

There is practically no strategy for targeted and pre-selected projects based on focus industries or plant types. The tendency is to target activities for all possible projects, which makes it difficult to initiate and complete all required sales and marketing actions, such as competitive quotations and required product approvals.

The procurement strategy between end-user (plant owner) and project engineering company is not understood well. The type of contract may be known, but the details and the implications to case company are often not realized.

There is no understanding of general project key performance indicators for vendors, such as sourcing location requirements. This makes it difficult to be competitive and plan and prepare sales and marketing actions and supply chain.

Customer contacts are narrow and shallow. The tendency is to keep contact with the known and self-evident decision makers, but there are not enough contacts with wider selection of experts and decision makers, such as product group decision makers and influencers or with other departments and managers for wider perspective involved in plant design and decision making, such as process department and licensors.

Customer project specific competitor behavior is not well understood. There is not enough analysis on the type of product group offering from competitors for specific projects, their approval status and business approach.

Sales action timing with customer project stages

The sales and marketing actions are often initiated too late. This is particularly true in the very early stages of the project engineering, such as FEED. This is realized with value proposal, product type approvals and contacts with project key-decision makers.

Product offering

Project specific product group offering is not defined in most cases. The practice is to use the same general product group offering as a guideline, without deeper investigation, analysis and decision about the best suitable product types to specific projects.

There is missing end-user, engineering company and process licensor product and factory approvals partly for whole product portfolio, but this is particularly valid for product type B, even though there are actions on-going. There is still a lot of work to be done for this issue.

There are some technical gaps in product group for both type A and B with respect to product features and gaps in fulfilling customer specifications and international standards.

Strong position in system integration with product group is not fully capitalized in marketing. The approval statements from system providers are not available. This is often requested by the customers.

There is no support for customer plant models, even if the capabilities exist. This should support the integration with customer models in very early project engineering stages, such as feasibility and FEED and would be useful for quotations later project stages.

Resourcing

Customer visits by local and global sales supported by business and product management is not frequent enough**.** Internal global project resource support is not sufficient; this applies for business line, product management and local sales. Sales incentives as a part of these group's sales budget and KPI's are missing. The lack of manpower is particularly visible in very early stages of the project engineering, such as FEED.

There are also not enough resources to support the engineering capabilities that take place at customer premises, also known as in-house engineering.

Sales tools

Current project sales tool does not match with today's project business requirements. It does not support well the real-life project sales and marketing planning and actions. This has already been identified by the case company and there is an on-going action to improve this tool as a part of the new customer relationship management (CRM) tool. Due to the on-going business development action, it was decided that this weakness topic was excluded from this study.

3.3.1 Product marketing strengths in project engineering

This chapter describes the strengths of product sales and marketing practises for project engineering stages. The analysis is based on key-stakeholder interviews. The main practices identified in current state analysis for strengths were project sales organizations, product group portfolio, product type A approvals, system integration, after sales performance and in-house engineering.

Project sales organizations

The global oil & gas project sales teams combined with locals sales teams for FEED and EPC engineering stages is seen as an asset. This supports the global project business and helps the company to be involved in the early phases in projects and supports the whole project sales process. This is particularly important in managing international, complex EPC-projects, where the sales and marketing efforts needs to be done in several geographical locations with different EPC-companies. These global project teams have been recently established, so there are still some development steps to be taken to get the teams in full speed, but it certainly is going to the right direction. Key-account sales and local nominated account sales teams support the approval processes, contacts and actions with end-users (owners).

Product group portfolio

Overall product group portfolio is an asset for the case company. The product portfolio is large, covering the vast majority of petrochemical applications. With the portfolio can be covered both severe and low-demanding applications. The new line of products, type B, completes the product group portfolio and increases overall competitive capabilities.

Product type A approvals

Product type A in product group was mentioned to be well listed and approved by end-users and project engineering companies. The case company is well known for the product type A products, and has good reputation and fair installed base references in global petrochemical plants. These products are well accepted and approved by case company's key-accounts and project engineering companies.

System integration

The case company has a good position with system vendors. These systems are used to automatically control a petrochemical or any other manufacturing process. The system typically uses custom designed processors as controllers and uses both proprietary interconnections and standard communications protocol for communication. The case company has ensured that it's products are well integrated with major system

suppliers. This ensures that the system vendors will put case company into the approved vendor lists with their systems. Many system vendors does not have their own product supplier. Benefit is to get strong support from them and wider coverage. This supports case company for certain type of project engineering concept. The recent business divest in case company increases the competitivness in this area.

After sales performance

Case company's after sales performance is well recognized among end-users (owners). It is known to support the whole plant lifetime performance to ensure safe and continuous plant operations according to plant maintenance targets. This is a valuable asset for case company that supports the whole product sales and marketing process and product approvals with end-users.

The after sales capabilities is recognized to add value for customer plant lifetime performance from plant start-up and commissioning to plant shutdown and maintenance activities. Case company has strong global and local service personnel presence in several locations. The service centers give an extra support for customer sourcing as spare parts and maintenance activities.

In-house engineering

There is a team of engineering experts that can support customer engineering by providing expertise for product group in question at customer's premises. These experts are currently utilized at project engineering after FEED. The activities involve all kind of support for product selection and sizing to fullfill the specific project customer requirements.

3.4 Summary of current state analysis

Figure 4 presents the summary of weaknesses and strengths identified. The main topic areas are highlighted and sub-headings briefly described.

Weaknesses	Strengths
Project baseline	
Strategic project selection	Account sales and quotation teams
Understanding project procurement strategy	Project execution and service capabilities
Understanding Project vendor KPI's	
Understanding project specific competitor behavior	
Timing of actions	
Late timing of sales actions	Product approval actions
Product offering	
Project specific product offering	Large product group portfolio
Customer / licensor approvals	Control system integration
Technical product gaps	Product type A approvals
Control system integration	
Support customer conceptual plant models	
Resourcing	
Customer visit frequency and quality	Account sales and quotation teams
Global project resource support	
Lack-of manpower in early project stages	
Engineering at customer premises for earlier project stages	Engineering at customer premises for execution project stage
Sales tools (excluded from this study)	
Does not support well the real-life project sales and marketing activities	On-going development actions

Figure 4. The summary of weakness and strength areas identified

These weaknesses and strengths presented in figure 4 are utilized in building conceptual framework by studying best practices of product marketing to industrial projects in section 4.

4 Best practices of product marketing to industrial projects

This section presents the best practices identified in industrial business capital sales and marketing principles applied to petrochemical plant project stages and case company product group sales and marketing activities. For successful product sales in industrial business to business markets it is important to understand the characteristics of business markets, business buyer behavior and business buying process, which are described in chapters 4.1 to 4.3. Chapter 4.4 presents how the conceptual framework was built by using the best practices discovered in literature combined with current state analysis presented in section 3, EPC-project stages and case company current product group marketing practices. Chapter 4.5 summarizes the conceptual framework.

4.1 Characteristics of business markets

Business markets contain fewer but larger buyers than the consumer markets. Business buyer demand is derived from final consumer demand. Demand in many business markets is more inelastic, which means that it is not affected as much in the short run by price changes. Demand in business markets fluctuates more and more quickly. The demand for many business goods and services tend to change more and more quickly than the demand for consumer goods and services. Business purchases involve more buyers. Business buying involves a more professional purchasing effort and business buyers usually face more complex buying decisions. (P. Kotler & G. Armstrong 2011: 167, 168)

The EPC-project business involves many buyers, sometimes in different locations, particularly in large, complex projects with many plants when plant owner (end-user) is in different location and EPC-companies in various countries.

The business buying process is formal and buyers and sellers work more closely together to build close long-term relationships. In complex purchasing several people will participate in decision-making process. Beyond technical experts and top management, B-to-B marketers face high-level, well-trained supply managers. This means that selling companies must have well-trained marketers and salespeople to deal with this these type of buyers. In the business buying process, the buyer and seller are often much more dependent on each other. In the short run, sales go to suppliers who meet

buyers' immediate product and service needs. In the long run, business-to-business marketers keep a customer's sales and create customer value by meeting current needs and by partnering with customers to help them solve their problems. Many customer companies are now practicing supplier development to develop networks of suppliers and partners to ensure an appropriate and dependable supply of products and materials that they will use in making their own products or resell to others. (P. Kotler & G. Armstrong 2011: 168, 170)

Supplier development and partnering with product vendors is important to consider in EPC-projects, where companies are looking to partner with high-quality suppliers who have technical experts that can support them in complex engineering efforts.

4.2 Business buyer behavior

When designing marketing activities, marketers should understand what happens within the customer organization that turns marketing and other stimulations into purchase responses. Within the organization, buying activity consists of two major parts: the buying center with all the people involved in the buying decision and the buying decision process. The buying center and the buying decision process are influenced by internal organizational, interpersonal, individual and external environmental factors. (P. Kotler & G. Armstrong 2011: 170, 171)

A company buying a product or service for the first time faces a new task situation. In such cases, the greater the cost or risk, the larger the number of decision participants and the greater the company's efforts to collect information. The new task situation is the marketer's greatest opportunity and challenge. The marketer not only tries to reach as many key buying influences as possible but also provides help and information. Many business buyers prefer to buy a complete solution to a problem from a single seller rather than separate products and services from several suppliers and putting them together. The sale often goes to the firm that provides the most complete system for meeting the customer's needs and solving its problems. This kind of solutions selling is often a key business marketing strategy for winning and holding accounts. (P. Kotler & G. Armstrong 2011: 171).

Complete product offering and solving EPC-project engineering problems should be considered in projects.

The buying organization's decision making unit or a buying center includes all the individuals and units that play a role in the business purchase decision making process. This group includes any of five following roles in the purchase decision process. 1) The users of the product or service often initiate the buying proposal and help define product specifications. 2) Influencers help define specifications and also provide information for evaluating alternatives. Technical personnel are particularly important influencers. 3) Buyers have formal authority to select the supplier and arrange terms of purchase. Buyers may help shape product specifications, but their major role is in selecting vendors and negotiating. In more complex purchases, buyers might include high-level officers participating in the negotiations. 4) Deciders have formal or informal power to select or approve the final suppliers. In routine buying, the buyers are often the deciders, or at least the approvers. 5) Gatekeepers control the flow of information to others. For example, purchasing agents often have authority to prevent salespersons from seeing users or deciders. Other gatekeepers include technical personnel and even personal secretaries. (P. Kotler & G. Armstrong 2011: 172).

In an EPC-project it should be important to recognize the people who have these purchasing roles within the project buying organizations. They may also be different at each project stage.

The buying center is not a fixed and formally identified unit within the buying organization. It is a set of buying roles assumed by different people for different purchases. Within the organization, the size and makeup of the buying center will vary for different products and for different buying situations. Business buyers respond to both economic and personal factors. Business buyers are also human and social. They react to both reason and emotion. Today, most B-to-B marketers recognize that emotion plays an important role in business buying decisions. When suppliers' offers are very similar, business buyers have little basis for strictly rational choices. Because they can meet organizational goals with any supplier, buyers can allow personal factors to play a larger role in their decisions. When competing products differ greatly, business buyers are tend to pay more attention to economic factors. (P. Kotler & G. Armstrong 2011: 172).

In an EPC-project the buying center can be very different depending on the size, location and type of project. It is therefore important to recognize the type of buying center and the buying roles at each project specifically. Recognizing the type of situation

against competition to build competitive strategy can help. Are competitive products similar or are they very different.

4.3 The business buying process

The business buying process is described by Kotler & Armstrong in Figure 5. Buyers who are involved in new task buying typically go through all the described stages of the buying process. The model shown in Figure 6 below provides a simple view of the business buying as it might occur in a new task buying situation. The actual process is usually much more complex. Each organization buys in its own way, and each buying situation has unique requirements. Different buying center participants may be involved at different stages of the process. Although certain buying-process steps usually do occur, buyers do not always follow them in the same order, and they may add other steps. A customer relationship might involve many different types of purchases ongoing at a given time, all in different stages of the buying process. The seller must manage the total customer relationship, not just individual purchases. (P. Kotler & G. Armstrong 2011: 178)

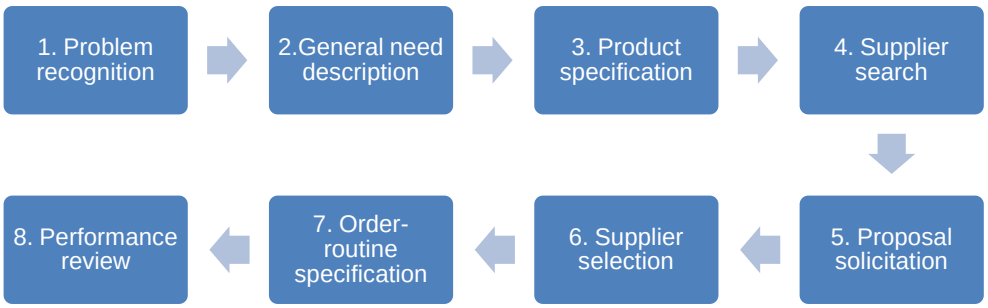

Figure 5. The business buying process by P. Kotler & G. Armstrong 2011.

1. Problem recognition

The buying process starts with recognizing a problem or need that can be met by acquiring a specific product or service. Problem recognition can result from internal or external initiation. Internally, the company may need new production equipment or materials or new parts may be needed to repair a broken machine. There can be needs to replace current supplier, because of product quality, service or price. Externally, the buyer may be contacted by a salesperson who offers better product or a lower price. Business marketers offer advertisement to alert customers to potential problems and

show how their products and services provide solutions. (P. Kotler & G. Armstrong 2011: 176)

Oil & gas project bidding development starts from implementing a process for category management. Category management helps to reduce the supply risk by establishing formal relationships with suppliers in categories that are of strategic importance to operations. The scope includes the selection of tendering and request process, bid development, bid comparison methods, risk profile of contracts, manufacturing strategy and value-added services. (D. Jacoby 2012: 54)

W.J. Johnston & J.E. Lewin 1996 discuss in their framework about macro-view of organizational buying behavior. They highlight in their model, that purchase risk associated with a given purchase situation, is a function of the importance, the complexity associated, the uncertainty of the outcome and the need to reach decision quickly for the particular purchase. A number of variety of variables can contribute to the level of risk associated, and most of these variables consist of environmental uncertainty, the characteristics of the buyer, the type of product to be purchased and the nature of the buy task (new or rebuy). Buyer-seller relationships and communication networks have the ability to influence the amount of risk associated with a particular purchase situation. (W.J. Johnston & J.E. Lewin 1996: 8)

When planning to build a new petrochemical plant, the problem to be solved in that case is a need to build certain amount of processing units with large amounts of products in question. In this case the initiative is always internal. This is recognized at the business planning stage of the project cycle by the plant owner; petrochemical processing plants require always certain amount of products. Some of these products are more critical for the safe and economical performance of the plant, while other part of the products can be considered to be less critical. It should be important to identify if the specific planned project consist of products that are of strategic importance to operations. The complexity and dynamics of the risk associated of the specific project buying behavior should be understood.

2. General need description

This stage describes the characteristics and quantity of the needed item. For complex items, the buyer may need to work with engineers, users and consultants to define the item. The team may want to rank the importance of reliability, durability, price and other

required aspects of the item. In this phase the business marketer can help the buyers define their needs and provide information about the value of different product characteristics. (P. Kotler & G. Armstrong 2011: 176, 177)

E. Hoffmann describes this step as demand assessment, that clarifies which objects should be procured and in what amounts, at what times and how often. Also should be clarified the costs of these procurement objects. The initiative for the procurement of capital equipment comes from the specialized department that should state the function provided by the equipment. Purchasing should clarify together with the specialized department the types of capital equipment suitable or available. Procurement planning forecast is required for regularly procured equipment. (E. Hofmann et al. 2012: 31-33)

In petrochemical projects this will be done at the conceptual/feasibility study by the EPC-company by the specifications provided by the plant owner. The process design is developed and an estimation including budget evaluation is done about the quantity and type of products required by the plant in question.

3. Product specification

The buying organization develops the technical product specifications, typically with the help of a value analysis engineering team. Product value analysis is used as an approach to cost reduction, where components are studied carefully to determine if they can be redesigned, standardized or made by less costly methods of production. The team decides on the best product characteristics and specifies them accordingly. Sellers can use value analysis as tool to help secure new account. By showing buyers a better way to make an object, outside sellers can turn straight rebuy situations into new task situations that give a chance to obtain new business. (P. Kotler & G. Armstrong 2011: 177)

This step refers to the specification of requirements to be recorded in general specifications. The content and scope of the general specifications depend on the importance, risk and value of the equipment to be procured. The requirements should be defined as precisely as possible. The buyer, user and the decision-maker should be involved in this process. The determinations of requirements are frequently reviewed in an iterative process by request of quotation. (E. Hofmann et al. 2012: 33)

In petrochemical projects this stage is usually done at the FEED phase. Here the users (plant owners) are building a new plant and typically give lists of approved valve vendors for their plants. It is quite typical to mention qualified type of products with certain features or even as accepted brand types. Here it is important to influence on these product type and brand approvals and specific descriptions of product types and features.

4. Supplier search

The buyer can compile a list of qualified suppliers by reviewing trade directories, computer searches and contacting other companies for recommendations. Today, more companies are searching the internet to find suppliers. For marketers, the internet gives smaller suppliers many of the same advantages as larger competitors. The supplier should get listed in major directories and build a good reputation in the market place. Salespeople should be active with companies in the searching of suppliers and ensure that their company is considered. (P. Kotler & G. Armstrong 2011: 177)

After the requirements have been specified, the type of capital equipment that meet these requirements should be clarified. Information about the product to be procured, potential suppliers and concrete market prices should be gathered. (E. Hofmann et al. 2012: 33)

Determining the optimal number of suppliers is important. In the procurement of engineered products, fewer suppliers are usually more effective than more suppliers. (D. Jacoby 2012: 54)

After recognizing the type of product required and approved in the petrochemical project, the approved vendor lists are formed. There might be some search for new suppliers also. This is typically done at the FEED stage of the project.

5. Proposal solicitation

In this stage the buyer invites qualified suppliers to submit proposals. When the item is complex or expensive, the buyer usually requires detailed written proposals or formal presentations from each potential supplier. Business marketers must be skilled in researching, writing and presenting proposals in response to buyer proposal requests. Proposals should be marketing documents, not just technical documents.

Presentations should inspire confidence and make the company stand out from the competition. (P. Kotler & G. Armstrong 2011: 177)

Quotations received should be checked for their legal validity and factual completeness (so-called quotation processing). If necessary information is missing, it should be requested from the supplier. Quotations should be subject to a technical and commercial check. If, after a formal check of the quotations, there are too many quotations left to be able to conduct well-targeted negotiations with all suppliers, a preliminary selection of the quotations must be made. (E. Hofmann et al. 2012: 33-34)

This stage is done at the project execution phase. The plant construction has been awarded to the engineering company(s), depending on the type of contract between plant owner and engineering company; the suppliers will issue proposals either to owners or engineering companies (mostly).

6. Supplier selection

The buying center will draw up a list of the desired supplier characters and their relative importance. These include product and service quality, reputation, on-time delivery, ethical corporate behavior, honest communication and competitive prices. The members of the buying center will rate suppliers against these characteristics and identify the best suppliers. Buyers may negotiate with preferred suppliers for better prices and terms before the final selections. Many buyers prefer multiple sources of suppliers and supplier development managers want to develop a full network of supplier partners that can help the company bring more value to its customers. (P. Kotler & G. Armstrong 2011: 177, 178)

There is empirical evidence that price is typically determined by the top two bidders, and does not decline with more than four bidders. Single sourcing is a viable option for services that are time critical, if supply market and in-house capabilities are limited. Buyers should continuously develop new and alternative suppliers to avoid high potential switching costs. Supplier development activities should first include consideration of existing suppliers of related products or services. Supplier qualification is an especially critical function in oil and gas generation. Projects are time driven and the non-performance of even one supplier may delay the whole major project at very high opportunity cost. Safety and environmental risks are also high. (D. Jacoby 2012: 54, 57, 58)

Low-cost country sourcing remains a big question for oil & gas industry. Oil & gas companies are usually not keen on low-cost country sources because of reliability concerns. However, suppliers use them on a routine basis to save costs in labor, regulatory controls and improved logistics especially from China. The growth of new emerging economies, like Vietnam, Thailand, Hungary and Turkey will offer further opportunities for low-cost sourcing. (D. Jacoby 2012: 65, 66, 67)

In the petrochemical project, the supplier selection starts at the project execution stage, and it is part of the procurement stage. The procurement stage itself is actually embedded as part of the various engineering stages and activities rather than border lined stage of its own. It is important to recognize the main influencers at the project buying center, both company teams (either owner or engineering company) and individuals within those organizations.

7. Order-routine specification

Order-routine specification includes the final order with the chosen supplier or suppliers and lists items such as technical specifications, quantity needed, expected delivery time, return policies and warranties. Many large buyers practice vendor-managed inventory, in which they turn over ordering and inventory responsibilities to their suppliers. Within this arrangement, buyers share sales and inventory information directly with key suppliers. The suppliers then monitor inventories and replenish stock automatically as needed. (P. Kotler & G. Armstrong 2011: 178)

Award negotiations are an interaction between buyer and seller from which both parties should emerge as “winners”. Nonetheless, both parties are interested in skillfully using their negotiating positions, which result, for example, from the seller’s monopoly position or the buyer’s market power. Essential for successful award negotiations is a good preparation of the negotiation organization and its procedure. The award decision can be made as soon as a negotiation result has come about that is satisfactory for the parties involved in terms of various criteria, such as price, quality agreements and due dates. After the decision has been made, contract drafting and ordering follow. Capital equipment frequently entails subsequent changes in the scope of performance. Order adjustments may result from changed requests by the procuring enterprise, or technical or commercial adjustments on the supplier’s side. (E. Hofmann et al. 2012: 34-35)

8. Performance review

In this stage, the buyer reviews supplier performance. The buyer may contact users and ask them to rate their satisfaction. The performance review may lead the buyer to continue, modify, or drop the arrangement. The seller's job is to monitor the same factors used by the buyer to make sure that the seller is giving the expected satisfaction. (P. Kotler & G. Armstrong 2011: 178)

After the capital equipment has been delivered, it must be checked whether the performance scopes specified in the contract have been complied with (monitoring delivery and release). (E. Hofmann et al. 2012: 35)

In petrochemical project this is the job of the project procurement department. The procurement team is asks feedback from product users, both engineering companies and users (plant operators). This feedback will be used to rate the vendors for next projects, and poor feedback may result in disqualification and it becomes more difficult to get more proposal requests.

For selected suppliers, operators need to decide how to allocate resources to get the most out of the supplier. D. Jacoby presents 2 models for structuring alliances. He presents in these models that there are nine dimensions to partnership, where the depth and the nature of the partnership evolves as the relationship progresses through the five steps of the partnership ladder, starting from 1) transactional supplier, 2) pre-ferred supplier, 3) value-added supplier, 4) collaboration partner to the highest level of 5) strategic partner. (D. Jacoby 2012: 68, 69)

4.4 Building conceptual framework for this study

The conceptual framework in this study is a model where the horizontal axis is formed by two layers. The first layer presents the petrochemical plant project stages progressing from left to right. These project stages were studied and presented in chapter 3.1. The second horizontal layer presents the business buying process for capital equipment purchasing in business to business markets. The business buying process stages follows the model by P. Kotler & G. Armstrong, described in chapter 4.3. These two horizontal layers were connected by analyzing and discovering the specific buyer-supplier behaviors at specific project and business buying process stages at chapter 4.3.

The vertical axis of the model presents the case company weaknesses discovered in chapter 3.2. The best practices discussed and presented in chapter 4.3 were connected with the weaknesses. This connection was done by analyzing the best practices and discovering where the specific best practice will support in petrochemical project stage and for what specific weakness area. The sources of best practices from literature are indicated in the model. The best practices are presented as models in tables 1 – 4 below for each identified development area.

Table 1. Best practices for project baseline area.

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Project baseline ⇩	New production equipment[8)] Replace current supplier[8)] Buyer contacted by salesperson[8)] Evaluate the type of supplier for the project[9)]	Quantity of needed items[8)10)] Buyer team ranking items (reliability, durability, price)[8)10)] Forecast procurement planning[10)]	Supplier build good reputation[8)] Target number of suppliers[9)] Potential suppliers[10)] As precise requirements as possible for the items[10)] Iterative process via request of quotation[10)]	High quality proposals[8)10)] Presentations inspire confidence[8)] Supplier rating[8)] Identify top bidders[9)] Preliminary selection of the quotations[10)]	Awarded supplier negotiations[10)] Identify negotiation positions[10)] Final order and contract with chosen supplier[8)10)] Supplier order performance review and control.[8)10)]
No process for strategic, target project selection by industry					
Understanding project procurement strategy					
Understanding Project specific vendor KPI's					
Understanding project specific competitor behavior					

8) P. Kotler & G. Armstrong 2011

9) D. Jacoby 2012

10) E. Hofmann et al. 2012

Table 1 presents the best practices selected for project baseline area. Project baseline area is a general category comprising of practices related to product sales process

through all project stages. The selected practices are aimed to improve strategic, industry focused project selection, understanding the project procurement practices, understanding the project supplier selection and ranking, and understanding competitor behavior. The practices comprise of understanding the type of business problem, required suppliers and items to be purchased, supplier ranking and requirements, proposal practices, negotiations and supplier performance reviews. The sources of best practices are indicated below the table.

Table 2. Best practices for timing area.

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Timing	Marketer advertisement of products and services[8)]		Get listed in major directories[8)] Marketer presence in information sources and contact with buyer[8)]		
Late timing of sales actions					

8) P. Kotler & G. Armstrong 2011

Table 2 presents the best practices selected for timing area. Timing is especially critical for the marketer in the business planning and problem recognition as well as at the FEED project stage where products are specified and supplier selection starts. These practices involve marketer advertisement activities, presence in directories and information channels and contacting the buyer. The sources of best practices are indicated below the table.

Table 3. Best practices for product offering area.

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage	1 Problem recognition[8)]	2 General need de-scription[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Product offering ⇩		Marketer define buyer needs and provide value of product features[8) 9)]	Type of products[10)] Product value analysis[8) 9)] Best product characteristics specified[8)] Show a better way to make an ob-ject[8)]	List of supplier characters and their relative importance[8)] Negotiations with preferred supplier for better prices[8)] Existing suppli-ers of related products[9)]	Inventory man-agement[8)] Sales and invento-ry information shared with key-suppliers[8)]
Project specific product offering					
Customer / licensor approvals					
Technical product gaps					
Control system integration					
Support cus-tomer concep-tual plant models					

8) P. Kotler & G. Armstrong 2011

9) D. Jacoby 2012

10) E. Hofmann et al. 2012

Table 3 presents best practices selected for product offering area. Product offering is important throughout the project stages. The best practices selected are aimed to improve defining project specific product portfolio, product approvals, and technical product gaps, product system integration marketing and integrating products with customer conceptual plant models. The practices involve defining buyer needs and showing value of products for buyers, supplier selection and development. The sources of best practices are indicated below the table.

Table 4. Best practices for resourcing area

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage	1 Problem recognition[8)]	2 General need de-scription[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Resourcing ⇩	Understanding the complexity and dynamics of the specific project buying behavior[11)]	Buyer needs to work with engi-neers, users and consultants[8)]	Sales people should be active[8)] Buyer, user and decision-maker involved[10)]	Buyer buying center[8)] Supplier devel-opment manag-ers[8)] Sourcing loca-tions[9)]	Good preparation of the negotiation organization and its procedure[10)]
Customer visit frequency and quality					
Global project resource support					
Lack-of man-power in early project stages					
Engineering at customer premises					

8) P. Kotler & G. Armstrong 2011
9) D. Jacoby 2012
10) E. Hofmann et al. 2012
11) W.J. Johnston & J.E. Lewin 1996

Table 4 presents the best practices for resourcing area. Resourcing is important throughout all the project stages. Resourcing is important to take into account in all contacts and correspondence between buyer and supplier. The best practices selected aims at improving customer visit frequency and quality, global project resource support from specialists and management, as well as man-power for early project stages and engineering at customer premises. It involves understanding the project buying behav-ior, identifying the buying center, the most important decision makers at each buying stage and their roles, supplier development roles and the negotiation organization and procedures. The sources of best practices are indicated below the table.

4.5 Summary of conceptual framework

Table 5 below presents the summary of the best practices. The main development areas are presented and combined together to the same model.

Table 5. Summary of best practices as conceptual framework.

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Project baseline	New production equipment[8)] Replace current supplier[8)] Buyer contacted by salesperson[8)] Evaluate the type of supplier for the project[9)]	Quantity of needed items[8)10)] Buyer team ranking items (reliability, durability, price)[8)10)] Forecast procurement planning[10)]	Supplier build good reputation[8)] Target number of suppliers[9)] Potential suppliers[10)] As precise requirements as possible for the items[10)] Iterative process via request of quotation[10)]	High quality proposals[8)10)] Presentations inspire confidence[8)] Supplier rating[8)] Identify top bidders[9)] Preliminary selection of the quotations[10)]	Awarded supplier negotiations[10)] Identify negotiation positions[10)] Final order and contract with chosen supplier[8)10)] Supplier order performance review and control.[8)10)]
Timing	Marketer advertisement of products and services[8)]		Get listed in major directories[8)] Marketer presence in information sources and contact with buyer[8)]		
Product portfolio		Marketer define buyer needs and provide value of product features[8) 9)]	Type of products[10)] Product value analysis[8) 9)] Best product characteristics specified[8)] Show a better way to make an object[8)]	List of supplier characters and their relative importance[8)] Negotiations with preferred supplier for better prices[8)] Existing suppliers of related products[9)]	Inventory management[8)] Sales and inventory information shared with key-suppliers[8)]
Resourcing	Understanding the complexity and dynamics of the specific project buying behavior[11)]	Buyer needs to work with engineers, users and consultants[8)]	Sales people should be active[8)] Buyer, user and decision-maker involved[10)]	Buyer buying center[8)] Supplier development managers[8)] Sourcing locations[9)]	Good preparation of the negotiation organization and its procedure[10)]

1) Shell 2015, 2) EPC Engineering Portal 2015, 3) Chiyoda 2015 4) Technip 2015, 5) Fluor 2015, 6) JGC 2015, 7) H. Baron 2015, 8) P. Kotler & G. Armstrong 2011, 9) D. Jacoby 2012, 10) E. Hofmann et al. 2012, 11) W.J. Johnston & J.E. Lewin 1996

As seen in table 5, the matrix shows the selected best practices for each development area and project stage. The sources of best practices are indicated below the table.

5 Building proposal for improved product group marketing practices in project engineering

This section describes how the proposal for the improved product marketing practises for project business was built and the proposed practices for identified development areas in current state analysis.

The proposal was built with same key-stakeholders that were interviewed in chapter 3.3. Four key-stakeholders were interviewed from global product group business management and global project management. Three 1,5 hour sessions took place at case company premises at 8th, 9th and 30th June 2015. The conceptual framework used for the sessions was presented in section 4. The outcome of the proposal is presented in chapters 5.1 – 5.4 for each weakness area. The summary of the sessions are presented in appendices 5 - 8. Strengths discovered in chapter 4.3 are embedded into the proposal and discussed in chapter 5.5 and presented in appendices 9 - 12. The summary of the proposed product marketing model is presented in chapter 5.6.

5.1 Building practices for project baseline area

Analysis of strong industries, processes and applications where case company has been successful and well-recognized by customer was seen as one of the key-issues. It is important to include all product types into the analysis, since petrochemical plants require all types of products. Success in other product types could help in cross-selling the product types selected for this study.

A market demand analysis should be conducted for the recognized strong areas. This would help further in prioritizing the actions for those industries were the market is expected to grow the most. A process should be defined for strategic project selection where the most important criteria of selection and persons participating are identified. The result of this analysis and definitions would be a list of focused, target industries for the product type in question. These analyses are related to customer business planning and problem recognition stages, before the actual decisions to built a plant. Information about the planned (not yet decided) plant construction activities by end-users could be used for the market demand analysis.

Regional and end-user specific requirements, such as specific material certification requirements, should be understood at a very early stage of the project, preferably already at the project feasibility stage. That would leave some time for required actions, before the project arrives to FEED and execution stages.

Quotations at FEED stage should always be done only for the strategically selected industries. Up-to date price lists should be made available for EPC's. Trained, in-house engineers should be addressed to be available for FEED stage. Plant commission support should be ensured and presented to customers.

In project execution stage it is extremely important to ensure competitive pricing for the selected projects. Case company supply chain development is a key to competitive cost levels. In-house engineering capabilities should be utilized at full potential in order to provide the optimum product solutions for the EPC. Plant commission support should be ensured and presented to customers also at execution stage.

At the procurement stage, there will often be order revisions due to many reasons. Change management capabilities should be developed in order to support customers order revisions. Flexibility would therefore help in giving better customer service and also give a good ranking evaluation from the project procurement team.

Supplier ranking items, such as reliability, durability, environmental aspects or price should be recognized. These types of items are typically part of project procurement strategy. The type of contract between plant owner and EPC should be recognized, since it has a direct impact on the project buying center buying behavior towards suppliers and it also defines the contact points. Deeper understanding of project buying center, such as their roles, their incentives, personal preferences, mutual relationships and recognizing the decision makers is very important and this should be recognized at both FEED and execution stages. Site specific procurement organization should be recognized separately; they are different people compared to earlier stages. Change and item or feature add-on order management capabilities play a vital role in successful vendor procurement strategy.

Establishing and maintaining contacts to project procurement organization at FEED stage is a key in understanding the project vendor KPI's. The establishment depends on the type of customers in the project and the location. Some locations and customers

are more easily to be reached than others. There are variations with contacts geographically. Schedule and budget are essential items at execution for vendor KPI's. At procurement it is essential to recognize the project specific terms and conditions, such as penalties and liabilities.

Recognizing competitors and their practices is important in preventing them dictating the specifications, like type of products and/or product features. This practice should be initiated at very early stage, preferably at feasibility stage already. This would ensure that case company is ready to highlight unique product features and influence the specifications at FEED stage. Table 6 presents the proposed practices for project baseline area. The model presents the practices aimed at solving the issues at specific project stages.

The summary of proposed practices for project baseline area is presented in appendix 5.

5.2 Building practices for timing issues

Timing as a development area is strongly related to other development areas. Many actions in other development area actually also improves the timing. This is particularly valid for those actions that are targeted to be started earlier at customer project and business planning stages. Proposal for practices to improve timing issues is presented in appendix 6.

In order to be on time with sales and marketing actions, the coming, planned projects by customers should be recognized, preferably at feasibility stage already. This ensures that the correct product sales and market activities can be coordinated starting from FEED stage and product approvals required by project buying center can also be ensured. The model in appendix 6 presents the practices aimed at solving the issues at specific project stages.

5.3 Building practices for product offering

The product strategy should be defined at project feasibility stage for strategically selected projects. This aims at improving the competitiveness for the most important must-win projects. Thorough product strategy requires time and resources, since every project is different, and therefore also the product strategy should be project specific. Therefore, the resources should be focused on strategically important projects. Over-engineered product and product features should be avoided at FEED stage, when budgetary proposals are given. This has a direct impact on competitiveness. Avoiding over-engineered, expensive solutions improves remarkably the possibilities to be selected as a supplier to bid in the following project execution stage.

Product and factory approval processes with all key stakeholders (licensor, end-user, EPC) should be initiated at the project feasibility stage, when the buyer is specifying the needs and requirements for the project. This ensures that these actions are completed at the FEED stage, when the products will be specified for the project.

The product and product feature gaps should be recognized at the customer business planning stage, before the actual project engineering starts. The target market and strategic project selection plays an important role here, since the actions for the product development actions should be considered for the targeted projects. There should be the capability to make go and no-go decisions for product development actions based on the type of project.

The excellent capabilities in integrating the products for systems should be used better in marketing and these capabilities should be available as clear documentation with system vendor verifications.

Customer plant building conceptual models could be supported by providing easily transportable information about product measurements into the customer plant models (such as 3-D plant models). These should be part of the in-house engineering support provided for customers in their premises by case company in-house engineers starting at project FEED stage.

The summary of proposal for practices for product offering is presented in appendix 7.

5.4. Building practices for resourcing

End-user is the most important customer contact when the plant is in business planning stage. Therefore it is important to identify the end-user needs and requirements and understand their objectives and market status. This requires resources globally and locally to be in contact with end-users at various levels. The product capabilities should be promoted at feasibility stage. FEED stage requires global sales and product business management involvement supported by local sales teams. The local support is essential to establish and maintain contacts with EPC's and licensors involved.

The project requirements should be recognized and those requirements should be recorded and communicated to all levels at feasibility stage. Key-support team nomination is essential for strategic projects. The project requirements recognized at feasibility stage defines the key-competencies that are required at the key-support team, such as product manager support, application support or business management support.

Focusing resources to less number of projects and strategic projects in particular will make it possible to allocate key-support resources better and the quality of work will be better, and thus the probability of success will improve. Routine work in quotation process should be automated as much as possible by tools so that resources can be used to solve more complicated product selection in strategic projects.

Engineering at customer premises known as in-house engineering could be offered to customers at earlier project stages, starting from business planning stage with end-users. This could be part of the problem recognition with end-user where new, sometimes extraordinary technologies could be the best solution related to issues like noise reduction, emissions and safety. Further on, the engineering capabilities could be offered to applications that have significant value for customers. At FEED stage the value proposal goes deeper in finding the correct products for each recognized applications. The result is recognizing for example the piping engineering challenges, cost reduction possibilities or ways to improve plant safety.

The summary of proposal for practices for resourcing is presented in appendix 8.

5.5 Embedding strengths into the proposed practices

This chapter presents the strengths embedded at each development area. The strengths embedded are summarized in appendices 9 – 12. The proposed development practices for weaknesses and strengths are highlighted as red and green, respectively.

The global oil & gas project sales teams combined with locals sales teams for FEED and EPC stages supports the global project business and helps the company to be involved in the early phases in projects and supports the whole project sales process. Key-account sales and local nominated account sales teams support the approval processes, contacts and actions with end-users (owners).

Case company's after sales performance is well recognized among end-users (owners). It is known to support the whole plant lifetime performance to ensure safe and continuous plant operations according to plant maintenance targets. This is a valuable asset for case company that supports the whole product sales and marketing process and product approvals with end-users.

Appendix 9 presents the summary of proposed practices with strengths for project baseline area.

Product type A in product group was mentioned to be well listed and approved by end-users and EPC's. The case company is well known for the product type A products, and has good reputation and fair installed base references in global petrochemical plants. These products are well accepted and approved by case company's key-accounts and EPC's. This is important for timing, since this supports the whole product group's sales and marketing actions. It means that the marketing can be initiated immediately when recognizing the need for type A products.

Appendix 10 presents the summary of proposed practices with strengths for timing issues.

Good position and integration with control system vendors ensures that the system vendors will put case company into the approved vendor lists with their systems. This is an advantage for business planning stage. It supports also the feasibility stage, especially for specific type of project contracting concept. This gives a clear advantage in the following project execution stages when proposals are issued and suppliers selected.

Overall product group portfolio is an asset for the case company. The product portfolio is large, covering the vast majority of petrochemical applications. The portfolio covers both severe and low-demanding applications. The new line of products, type B, completes the product group portfolio and increases overall competitive capabilities. This advantage is realized in FEED, execution and procurement stages, when product specification and supplier selection starts and proceeds to proposals and final negotiations.

Product type A is well accepted, known and approved by case company's customers. The reputation is good with fairly large installed base references in global petrochemical plants. This gives a competitive advantage with customers that know these products and have experience.

Appendix 11 presents the summary of proposed practices with strengths for product offering.

Case company engineering experts that support customer project engineering at customer premises (in-house engineering) are an important resource for project business. These resources are currently used at project execution stage when products are selected and sized to fullfill the specific project customer requirements.

The global oil & gas project sales teams combined with local sales teams for FEED and EPC stages are an important resource for the global project business and helps the company to be involved in the early phases in projects and supports the whole project sales process. Key-account sales and local nominated account sales teams support the approval processes, contacts and actions with end-users (owners).

Case company's after sales performance is well recognized among end-users (owners). It is known to support the whole plant lifetime performance to ensure safe

and continuous plant operations according to plant maintenance targets. This is an important resource for case company that supports the whole product sales and marketing process and product approvals with end-users. The local service centers support customers in several locations for maintenance activities and product re-selling.

Appendix 12 presents the summary of proposed practices with strengths for resourc-ing.

5.6 Summary of proposed marketing practices

Table 14 in next page summarizes the proposed practices for product marketing in project business. Red labels indicate the proposed practices to improve the current weaknesses. The green labels indicate the strengths discovered. The development (red) practices are mostly proposed for project feasibility and FEED stages, where the purchasing need is described and the buyer needs to work with engineers, users and consultants followed by product specification and supplier search. This requires activity from case company sales people for FEED stage with the project buying center (buyer, user and decision-makers).

Table 14. Summary of proposed practices for product marketing.

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Project baseline					
Strategic project selection	Define process	Market requirements	Focused quoting	Pricing	Flexibility
Understanding project procurement strategy		Supplier ranking	Recognize buyers	Recognize buyers	Recognize buyers
Understanding Project vendor KPI's			Contacts, location	Schedule and budget	Terms and conditions
Understanding project specific competitor behavior		Recognize competitor approach	Promote unique features		
Project sales organizations	Account sales teams		Global FEED team	Global EPC and local teams	Global EPC and local teams
Timing					
Late timing of sales actions		Recognize coming projects	Coordinate activities	Coordinate activities	
Product approvals	Actions on-going				
Product offering					
Project specific product offering		Product strategy	Avoid over-engineering		
Customer / licensor approvals		Initiate approvals	Complete approvals		
Technical product gaps	Recognize and start actions				
System integration	Good position with vendors	Supports specific contracting	Documentation available	Excellent integration	
Support customer conceptual plant models			Easy integration		
Product group portfolio			Large	Large	Large
Product type A approvals	Well approved				
Resourcing					
Customer visit frequency and quality	Define requirements	Promote capabilities	Global and local combined		
Global project resource support		Recognice & communicate	Nominate key-support team		
Lack-of manpower in early project stages			Select projects, automate routines		
Engineering at customer premises	Extraordinary technologies	Promote value	Recognize applications	Engineering team actions	
Account sales teams	Account teams		Global FEED team	Global EPC team & local teams	Global EPC team & local teams
After sales	Global & local			Customer sourcing	

As seen in table 14, for project baseline issues the actions are related to defining strategic project selection process and understanding the market requirements with focused quotations for selected proejcts. Product pricing plays an important role for competitivness. Flexibility is required to support changes in orders. Better understanding of supplier ranking and company's position is important. Recognizing project buying center roles and contacts are important throughout the project sales process. Recognizing competitor approach and promoting unique product features plays an important role. These actions are supported by the project sales teams targetted for end-users and engineering companies through the sales process.

Recognizing the coming projects early, at project feasibility stage and coordinating the sales and marketing activities in the following stages is a key to improve the timing issues. This is supported by on-going product approval actions with end-users.

Project specific product strategy should be defined at feasibility and over-engineered, non-competitive solutions should be avoided at project execution stage. Product approvals with various buying center stakeholders should be started early on and completed by FEED stage. Technical product gaps should be recognized and required actions should be started at business planning stage. These actions are supported good position with systme supplier that supports specific contracting type and provides excellent product integration for egineering purposes. These system supplier approvals should be documented and be available for marketing purposes. Large product group portfolio supports the engineering actions starting from FEED stage. Product type A customer approvals is an important asset for the whole product group portfolio.

Requirements for project specific customer visit frequency should be defined to plan for required resources. Promoting capabilites followed by global and local support. Business and product management support should be recogniced early on and key-support team should be nominated at FEED stage. Targeting resources to selected projects and automating routine quotation work is required in order to get the resources used effectively. Engineering at customer premises should be targetted to earlier project stages. Account sales teams for end-users and engineering companies are an important resource for projects. Global and local service teams support the plant start-up and commissioning, product re-sell and upgrade activities.

6. Key-stakeholder feedback on proposed marketing practices

This chapter presents the feedback on proposed product sales and marketing model for project business. The first section describes how the feedback sessions were organized, the second section presents the feedback received and third section presents the final product marketing model based on the feedback received.

6.1 Description of feedback sessions

The feedback sessions were conducted with key-stakeholders from product and project management, who had been involved also in current state analysis interviews and building proposal for product group marketing practices. The product marketing practices matrices, presented in appendices 9 – 12 and the proposed model summarizing the practices, presented in chapter 5.6 as table 14 was sent prior the discussions to management to be studied and reviewed beforehand. The proposed product marketing models were discussed with each key-stakeholder during 13th and 14th August 2015 at case company premises. First, the management was asked to review and confirm of the customer project stages and the connected business buying process stages at each project stage. Secondly, the management was asked to review and confirm the weaknesses and strengths discovered in current state analysis. Thirdly, the management was asked to review and confirm the proposed practices at each development area and their location in the matrix. Finally, the management was asked to give general comments and final suggestions for summarized model.

6.2 Feedback received

The customer project stages and the connected business buying process stages were confirmed as such with no additional comments. The weaknesses were also confirmed as such with no additional comments.

For the strengths, there were couple of additional comments and changes: 1) global *quotation teams* and capabilities are also strengths for the case company, and this was added to project baseline and resourcing areas as part of account and sales teams. 2) *Product execution* during and after procurement and *service* capabilities are strengths for the case company after the customer pre-purchase stages. These were added as part of project baseline issues, since these are well-recognized by customers, and

therefore can be utilized as marketing tools to promote capabilities for plant commissioning, start-up and life-cycle care.

For the proposed practises there were few specific comments. In project baseline area it is important to *define criteria* for the strategic project selection. At project feasibility stage, it is important to understand the *type of contract* between the end-user and EPC, since the contract type defines the project buying centre and contacts and the power of price vs. value in purchasing. It was highlighted that in FEED and execution project stages it is important to *recognize the decision makers* at project buying organization.
Global and local product execution and services teams play an important role for the successful project delivery and customer care for delivery, commissioning and product life-cycle.

Practices for timing issues, the coming projects should be *recognized early* on at the feasibility stage, and the sales and marketing *activities should be planned* at FEED stage to be ready to *coordinate the activities* at project execution when supplier selection starts.

In practices for product offering the *competitive budgetary bidding* was recognized as the most important action at project FEED stage. Later on at project execution stage it is important to avoid *over-engineered product selection* for proposals. Customer and other project stakeholder *approval practices* was specified so that the *initiative* for approvals should take place at the business planning stage, followed by *confirming* the approvals at feasibility stage and finally have the approvals *available* at FEED stage of the project. Product type A customer *installed base* was highlighted as an important strength for the whole product group studied.

In practices for resourcing, the global business and product management support for project business needs to be *aligned and planned* properly according to the specific project needs. It was highlighted, that the local *sales teams KPI's and targets* should be re-defined to support the global project business. For engineering at customer premises should be included also the *application knowledge* and promote those capabilities at feasibility stage. *In-house engineering actions* should be considered also for customer FEED stage engineering. Global *quotation teams* are an important resource for the global and local account teams.

6.3 Final proposal based on feedback

This chapter presents the final proposal product group marketing practices for project business based on feedback received from management key-stakeholders.

Table 15 in next page summarizes the final proposed practices for studied product group marketing in project business. Red labels indicate the proposed practices to improve the current weaknesses. The green labels indicate the strengths discovered. The development (red) practices are mostly proposed for project feasibility and FEED stages, where the purchasing need is described and the buyer needs to work with engineers, users and consultants followed by product specification and supplier search. This requires activity from case company sales people for FEED stage with the project buying center (buyer, user and decision-makers).

Table 15. Final proposal for product group marketing practices in project business.

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage[1)]	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Project baseline					
Strategic project selection	***Define criteria***	Market requirements	Focused quoting	Pricing	Flexibility
Understanding project procurement strategy		Supplier ranking ***Contract type***	***Recognize decision makers***	***Recognize decision makers***	Recognize buyers
Understanding Project vendor KPI's			Contacts, location	Schedule and budget	Terms and conditions
Understanding project specific competitor behavior		Recognize competitor approach	Promote unique features		
Account sales and ***quotation*** teams	Account sales teams		Global teams	Global and local teams	Global and local teams
Product execution and service	Global & local			***Global & local***	*Product execution capability*
Timing					
Late timing of sales actions		*Recognize coming projects*	***Plan activities***	Coordinate activities	
Product approvals	Actions on-going				
Product offering					
Project specific product offering		Product strategy	***Competitive bidding***	*Avoid over-engineering*	
Customer / licensor approvals	***Initiate approvals***	***Confirm approvals***	***Approvals available***		
Technical product gaps	Recognize and start actions				
Control system integration	Good position with vendors	Supports specific contracting	Documentation available	Excellent integration	
Support customer conceptual plant models			Easy integration		
Product group portfolio			Large	Large	Large
Product type A approvals	Well approved ***Installed base***				
Resourcing					
Customer visit frequency and quality	Define requirements	Promote capabilities	Global and local combined		
Global project resource support		Recognice & communicate	***Align*** and nominate key-support team		
Lack-of manpower in early project stages		***Re-define sales KPI's for projects***	Select projects, automate routines		
Engineering at customer premises	Extraordinary technologies	Promote value and ***application knowl.***	***Engineering team actions***	Engineering team actions	
Account sales and ***quotation*** teams	***Global and local teams***		Global teams	Global and local teams	Global and local teams

As seen in table 15, for project baseline issues the actions are related to defining the criteria for strategic project selection and understanding the market requirements with focused quotations for selected projects. Product pricing plays an important role for competitiveness. Flexibility is required to support changes in orders. Better understanding of supplier ranking and type of contract between end-user and EPC is important. Recognizing decision makers and their roles at project buying center are important throughout the project sales process. Recognizing competitor approach and promoting unique product features plays an important role. These actions are supported by the project sales teams working with end-users and engineering companies through the sales process.

Recognizing the coming projects early, at project feasibility stage, planning the activities and coordinating the sales and marketing activities in the following FEED and execution stages is a key to improve the timing issues. This is supported by on-going product approval actions with end-users.

Project specific product strategy should be defined at feasibility, competitive budgetary quotation should be submitted at FEED stage and over-engineered, non-competitive solutions should be avoided at project execution stage. Product approvals with various buying center stakeholders should be started at business planning stage, confirmed at feasibility stage and completed by FEED stage. Technical product gaps should be recognized and required actions should be started at business planning stage. These actions are supported by good position with system suppliers and it supports specific contracting type and provides excellent product integration for egineering purposes. These system supplier approvals should be documented and available for marketing purposes. Large product group portfolio supports the engineering actions starting from FEED stage through the plant engineering process. Product type A customer approvals is an important asset for the whole product group portfolio.

Requirements for project specific customer visit frequency should be defined to plan for required resources. Promoting capabilites are followed by global and local support. Business and product management support should be recogniced early on and key-support team should be aligned and nominated at FEED stage. The local sales teams KPI’s and targets should be re-defined to support the global project business.Targeting resources to selected projects and automating routine quotation work is required in order to get the resources used effectively. Engineering at customer premises should

be targetted to earlier project stages. For engineering at customer premises should be included also the application knowledge and promote those capabilities at feasibility stage. Account sales teams for end-users and engineering companies are an important resource for projects. Global and local service teams support the plant start-up and commissioning, product re-sell and product upgrade activities.

7. Conclusions

This section presents the summary of the thesis, next proposed practical steps based on the marketing model, managerial implications, evaluation of the outcome compared with the objective of the study and credibility of the study.

7.1 Summary

The purpose of this study was to build a proposal for improved product marketing practices for case company's business segment, operating in petrochemical project-business. The case company is a global supplier of technology and services to a range of process industries around the world. The business segment's core customer industries are oil & gas, and pulp and paper.

To succeed in selling primary equipment for petrochemical plant projects requires marketing actions from vendors early on in the plant planning process, clearly before the official purchase decision stage. Case company has the challenge of delivering the correct sales & marketing message to the customers in the early engineering stages of the plant construction process. This applies particularly to the selected product group subject to this study.

The objective of this thesis was to propose a model for improved product group sales & marketing practices for the early stages of customer petrochemical project engineering. The business problem identification relied on the discussions with key-stakeholders in the case company's organization and the researcher's own experience related to the field of the study within the organization.

The data collection methods used in this study were in-depth interviews, secondary data sources and literature review. Open interview with secondary questions as a method suits well for this type of study that has the focus on interviewing small number

of key-stakeholders with the target of obtaining clear perspective and depth of interviewees' values and beliefs about the topics presented. Secondary data sources as a research method was applied to describe and define the customer plant project steps in general and the specific description of the pre-purchase decision steps. The best product marketing practices discovered in literature combined with customer plant project steps was used as the conceptual framework for the second interviews with key-stakeholders when building the proposal for improved product marketing model.

The research started with current state analysis, where the customer plant project engineering process was studied and described. The project process was studied by using data sources in public domain of companies involved in project engineering. The second part of the current state analysis involved case company's current product group marketing practices weakness and strength analysis for the project engineering process. This was studied by interviewing the key-stakeholders involved in global project business and product group business management. The outcome of the current state analysis was project engineering process description and case company product group marketing practises strengths and weaknesses in the described project engineering process.

The literature review presented the best practices of product marketing to industrial construction projects. The data was collected from various sources in relevant academic literature. The best practices in literature was focused on finding what is known about the subject and looking for existing theories and models created. Outcome was conceptual framework.

The best practices was used as conceptual framework in building proposal for improved product marketing practices in project business with focus on improving the weakness areas identified in current state analysis. These new, proposed practices were embedded with the strengths identified in the current state analysis. The outcome was first proposal for the improved marketing practices for the case company's product group in question for project-business. The proposed model was built with case company key-stakeholders.

In the final part the proposed marketing model was discussed with key-stakeholders. The final marketing model was created based on the feedback. The concluded

findings, next practical steps and managerial implications are presented in the next chapter of the thesis.

7.2 Next practical steps

The study was conducted in order to understand better the important milestones of customer petrochemical plant engineering stages prior to purchase decisions, the business process of capital product purchasing and how to improve product group sales and marketing practices for the early project engineering stages. The outcome of the study was a model for improved marketing practices of product group in question at specific customer petrochemical plant building stages. Should the case company consider applying this model for product group sales and marketing practises for project business, further recommendations may help in transforming the practices into actions.

First of all the model as such should be presented to a wider project and sales management level to get a deeper insight into the discovered findings and proposed practices. Further commitment is required from a larger group of key-stakeholders from project and sales management to initiate changes and new practices within the project sales process. It would be valuable to consider applying this model to other case company product groups supplied to project business.

7.3 Managerial implications

Recommendations for the management level, based on the results of the study would therefore consist of the following decisions to be taken.

1) The *proposed practices should be evaluated and defined based on their importance and value* for successful product group sales and marketing actions for project business. Some practices may be more valuable than others. A rating of practices, for example in a scale of 1 – 10, could help prioritizing and categorizing the actions. It may be also, that some of the practices could be combined, if they are strongly related to one another. There should be nominated a person or a team responsible for rating these practices, creating an action plan and taking care of the implementation. The rating, planning and implementation of the practices should involve key-stakeholders from project and sales management, since they are also the key-persons who will be influenced by these actions.

2) The case company's current *project sales process should be reviewed* and actions should be aligned with the customer's buying behaviour according to the plant project engineering stages. According to the study, there are actions required specifically for very early project engineering stages from business (plant) planning, feasibility to FEED, besides project execution and procurement. This indicates that the emphasis of sales actions in project business should be shifted more towards proactive approach to the earlier engineering stages from the current reactive approach in later engineering and procurement stages.

3) The alignment of project sales process should be confirmed with the case company's new sales process that has been renewed as a part of the new CRM-tool currently being implemented at case company business segment. It should be confirmed that *the new CRM-tool supports the proposals for improved product group sales and marketing practises for project business*.

4) It would be valuable to consider *applying this model to other case company product groups* supplied to project business. It should be kept in mind, that even though some practices may be common for all product groups, such as project baseline issues and timing issues, practices related to product offerings and resourcing may be very different due to the different positions in the markets and specific requirements, such as approvals and competences. Therefore, the model may not be repeatable as such with other product groups. It should be carefully considered, how to implement the model for project business, since sometimes there might be needs for a specific product group, and sometimes for several product groups, depending on the project.

7.4 Evaluation

The first part of this chapter discusses the evaluation of the objective of the study to the final outcome, and the second part discusses the credibility consideration of the study.

7.4.1 Outcome vs. objective

The objective of the study was to build a proposal for improved product group sales and marketing practices for petrochemical project business. The objective was approached by describing the project engineering stages and by recommendations for improved practices for the described project engineering stages. The first part of the study focused on investigating how customers describe themselves these plant project engineering stages. The outcome was the description of plant project pre-purchase stages. These project stages were utilized as the framework for the second part of the study, were the case company's current status of sales and marketing practices in these project stages were studied. The outcome was strengths and weaknesses of current sales and marketing practices. The third part of the study involved the investigation of best practices in literature of business to business sales and marketing practices. The identified best practices were used as the conceptual framework to improve the weaknesses identified in current state analysis. The final improved sales and marketing practices were created by applying the best practices for those parts of the project business process considered to be required. It can be considered, that the objective of the study was achieved.

One of the identified weakness areas in current state analysis, sales tools, were excluded for this study because there are actions on-going at case company to renew sales tools for customer relationship management and product configuration. The assumption was that these on-going actions will make improvements for the identified weaknesses in sales tools. These sales tools actions could be studied further in order to confirm the improvement needs identified in this study. This can be continued after this study is completed.

The improved product group sales and marketing model provides a very compact view of several practices discovered in each of the identified weakness area that requires actions in project business. It also shows those practices that are already done well. The study was focused on identifying the practices required in a conceptual level. Fur-

ther investigations are required for each of the identified practice to get more detailed plan for implementing the actions as next steps. This will require setting priorities for these actions, commitment from relevant management areas and nomination of key-persons to investigate these practices further and implement these actions. It could also be considered applying this model for other product groups in project business.

7.4.2 Credibility

Each of the research stages, data collection, analysis of the data and concluded findings were documented and described in detail during the study. Four key-stakeholders from case company were involved in the study. The experience of the stake-holders is significant within the studied field of business. The key-stakeholders were selected from product group business management and project business management to get the views from both product and project business standpoint. These two viewpoints were selected in order to avoid bias for either direction. The researcher has vast experience in the field of the business and several years of experience within the case company.

The business challenge was well recognized and relevant business issue at the case company. The studied business problem was selected and discussed with several stakeholders at the case company.

Several data sources was used to describe the plant pre-purchase engineering stages in project business, in order to identify the project stages and to confirm repeatable actions and behaviors at each of the project stage.

The current state analysis was done in order to recognize the current case company practices. The interviews were recorded as field notes and sent for each of the interviewees for validation and feedback. The literature best practices have been studied, and the proposal was built by using the best practices discovered in the relevant literature related to the studied business challenge. The proposal was built with the business and project management key-stakeholders to collect their experiences and recommendations. The final proposal was verified with them to confirm their final suggestions. The summary of interview questions and notes as well as proposal building and feedback notes are available as appendices in this study.

Based on the above description of the research process and documentation, it is arguable that the credibility of this study is adequate.

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Appendix 1: Current state analysis, key-stakeholder interview #1

Topic: Current product group marketing practises for projects

Information about the interviewee (interview #1)

Name	xxxx
Position in the case company	Oil & gas global product business management
Date of the interview	21.4.2015
Duration	1.5 h
Document	Field notes

Field notes (interview #1)

	Topic of the interview	**Field note summary**
0	Describe experiences in view of the topic problem	17 years in oil & gas and pulp & paper business at case company and 3 years in project engineering company.
1	Identifying opportunity What kind of people are contacted?	Not enough contacts to higher level people. More diversity wider customer interface is required.
2	Do we put relevant information related to product group requirements?	Not enough relevant information.
3	How well is end-user drivers understood?	We do not know customers well enough.
4	How well is known project scope and investement schedule?	We do not know customers well enough. Narrow customer interface.
5	How well are our products vendor listed?	Type (b) products not very well. Type (a) moderately. Type (b) is a new product, and lack of references.
6	Are relevant people involved in early FEED? Are they on time?	Not necessarily, not enough resources. Expecting some improvement due to resent organization changes.
7	How well is initial sales and product stratgey defined? How well does that fit with the FEED project technical specification requirements for vendors?	Product strategy is not so well defined in those projects where there is not nominated FEED project manager. In large projects, the product strategy definition is very challenging. Difficulties finding the project based product focus. Strategy is good in general level, but should be focused in projects.
8	When is sales project kick-off meeting held? Who participates? What is the target?	NA
9	How well are products vendor listed?	Not well at all. Those that are listed are not known by sales.
10	How does system suppliers influence in product offering or strategy?	Our devices are well suited with most systems.
11	How well do we succeed in getting our products listed during the FEED?	Not well enough.
12	Does budget quotation support to avoid significant changes during the execution phase (awarded)?	If technically complete quotation is required, we are within the 10% range.

	Topic of the interview	Field note summary
13	How well does the communication work between FEED players?	Not consistent. Case by case. It depends on individuals and contacts. There's no practises or guidelines.
14	How well does product marketing actions and customer contacts are in line with FEED schedule?	No clear model. No consistent way of working.
15	FEED-desing tools for optimum process flow that meet safety, operations and enviroment targets, conceptual 3-models. Do offer support for customers?	Not done actively enough. We don't have enough the product modelled and good tools to support that.
16	Data sheets with specific requirements and standards. Trying to influence on these?	No. Way too rarely. Not enough knowledge and resources. Not enough close relationships with customers.
17	Project complexity with international, different sizes, locations. How well can we support our customers with these requirements?	Strong country organization is a challenge. Relationship between countries and business management should work better. Country organizatios don't get the orders in their budgets.
18	How well do we undertsand or do we get information about the type of procurement strategy between EPC and end-user?	Not well. We should understand the procurement better and their evaluation criteria.
19	How well do we understand the different EPC drivers in bidder's bid?	We need to understand the commercial and technical drivers better.
20	Procurement strategies – EPC lump sum? EPCM? How succesful with sales and product strategy?	There is no influence with the contracting strategies for vendor product sales. Project specific procurement strategy is more important identify in order to select the correct product strategy

Appendix 2: Current state analysis, key-stakeholder interview #2

Topic: Current product group marketing practises for projects

Information about the interviewee (interview 2)

Name	xxxx
Position in the case company	Oil & gas global product business management
Date of the interview	22.4.2015
Duration	1 h
Document	Field notes

Field notes (interview #)

	Topic of the interview	**Field note summary**
0	Describe experiences in view of the topic problem	6 years in various duties related to process optimization, condition monitoring and installation. 12 years in case company in various product and business management positions.
1	Identifying opportunity What kind of people are contacted?	Key-accounts. There are local customers where we may not know or are not contacting the people. Depends on customers and location.
2	Do we put relevant information related to product group requirements?	A lot of information is inputted. No clear guidelines, what should be offered. There is not clear guideline in the system to create the desired product strategy. Tool does not support product grouping. Basic project information is OK.
3	How well is end-user drivers understood?	This depends on customer. Sometimes better, sometimes not so well.
4	How well is known project scope and investement schedule?	The public information is readily available and well.
5	How well are our products vendor listed?	Type (a) products are well listed. Type (b) products are not so well. End-user approvals are most important, because of more influence on the project. Approved is different than vendor listed.
6	Are relevant people involved in early FEED? Are they on time?	Our new organization is supporting this better. We should think about the strategic projects and how to define them. Our current quotation tools do not fully support quotations. Not enough time to define project specific product strategies. Better quotation tools would release resources for this. Project categorization and definiton should be done better. There is need for more skillful resources.
7	How well is initial sales and product stratgey defined? How well does that fit with the FEED project technical specification requirements for vendors?	Product strategy is defined according to datasheet. It is based on budgetary quotation. We are rarely involved in FEED phase. When we are involved, our experience shows that we have better chances at the later project stages. We should utilize better our in-house engineering capabilities.

	Topic of the interview	Field note summary
8	When is sales project kick-off meeting held? Who participates? What is the target?	NA
9	How well are products vendor listed?	Not well in control valves. For general service this is not relevant. Licensor recommendations for severe applications are important for the success of control valves. Sales does not know our licensor recommendations. The licensor agreements are not clearly documented and there are usually no agreements.
10	How does system suppliers influence in product offering or strategy?	We offer the same products regardless of system suppliers.
11	How well do we succeed in getting our products listed during the FEED?	This may be difficult to obtain. Unique features should be promoted. We are not involved at this stage currently.
12	Does our budget quotation support to avoid significant changes during the execution phase (awarded)?	Sometimes we offer to expensive solutions. This is related to product strategy definition and supporting tools.
13	How well does the communication work between FEED players?	NA
14	How well does our product marketing actions and customer contacts are in line with FEED schedule?	Feeling is that we do not know customer decision phases at FEED.
15	FEED-desing tools for optimum process flow that meet safety, operations and enviroment targets, conceptual 3-models. Are we involved here? Do we offer support for customers?	Normally is delivered 2-D pictures. This is important to be involved in.
16	Data sheets with specific requirements and standards. Are we trying to influence on these?	Sometimes there has been success, but mostly we are not succesful in this and often too late.
17	Project complexity with international, different sizes, locations. How well can we support our customers with these requirements?	Our product portfolio supports this well. This is very much depending on project. We are careful in marketing these capabilities to avoid 'over-promising'. Project specific marketing works better.
18	How well do we undertsand or we have the information about the type of procurement strategy between EPC and end-user?	Not applicable. In general level we understand the drivers, price or quality. We understand the contact points.
19	How well do we understand the different EPC drivers in bidder's bid?	NA
20	Procurement strategies – EPC lump sum? EPCM? How succesful with sales and product strategy?	NA

Appendix 3: Current state analysis, key-stakeholder interview #3

Topic: Current product group marketing practises for projects

Information about the interviewee (interview #3)

Name	xxxx
Position in the case company	Oil & gas global product business management
Date of the interview	24.4.2015
Duration	1.5 h
Document	Field notes

Field note summary (interview #3)

	Topic of the interview	**Field note summary**
0	Describe experiences in view of the topic problem	18 years in case company product business in various positions. Studied product type always involved.
1	Identifying opportunity What kind of people are contacted?	This depends on the customer organization. The approval can be site dependent. We have not created a systematic approval grid. There are product approval gaps. The approval process is varies by customer. Sometimes only paper work, sometimes is required factory approvals, sometimes is required field tests. We are not discussing wide enough organizational coverage.
2	Do we put relevant information related to product group requirements?	Currently our tools don't support this well. Tools are not well integrated. Development work is on-going, where the tools are combined. We get a lot of information in our systems, but it is hard to find the relevant information. We expect some improvements to this in 1-2 years time from the tool development projects.
3	How well is end-user drivers understood?	We know the drivers quite well. We understand the strategic drivers well, and their project concerns. We understand the oil & gas technical challenges. We have experience. The knowledge and skills are not spread in organization. We are capable of identifying the customer needs with small amount of information.
4	How well is known project scope and investement schedule?	In oil & gas, the processes are diverse, which makes it challenging. It is challenging to understand the coverage in projects with our products. We understand the project schedules and plant scope and have access to public information sources. Sometimes we know the connection between customer and vendors, but not always. We have volume advantage.
5	How well are our products vendor listed?	Not well enough. We are actively working on it. The customers are prioritised, we are looking for those customers where the approval process is easier, especially with type (b).
6	Are relevant people involved in early FEED? Are they on time?	The organization exists, but resources are not enough. Sales areas are not motivated to support.

	Topic of the interview	Field note summary
7	How well is initial sales and product stratgey defined? How well does that fit with the FEED project technical specification requirements for vendors?	If there is chance to change the customer specs, we have various options to suggest, and good guidelines to do that. We have good product portfolio with many opprtunities. We should know our competitors wekanesses better.
8	When is sales project kick-off meeting held? Who participates? What is the target?	Timing and project leader involvement is a challenge. We are sometimes too late. The sales project manager role should be identified better.
9	How well are products vendor listed?	Other product groups are better listed. Not enough licensor approvals with studied product group.
10	How does system suppliers influence in product offering or strategy?	We ensure the integration with major system suppliers. They will put us into the approved vendor lists with their systems. Our current position supports specific type of contractor concept. Recent business divest enhances this further.
11	How well do we succeed in getting our products listed during the FEED?	Not well enough.
12	Does our budget quotation support to avoid significant changes during the execution phase (awarded)?	NA
13	How well does the communication work between FEED players?	NA
14	How well does our product marketing actions and customer contacts are in line with FEED schedule?	We don't know this well. No clear idea, if we market our products on time at FEED stage.
15	FEED-desing tools for optimum process flow that meet safety, operations and enviroment targets, conceptual 3-models. Are we involved here? Do we offer support for customers?	It is possible, but we may not utilize this opportunity fully.
16	Data sheets with specific requirements and standards. Are we trying to influence on these?	We are trying to influenece. We understand the important drivers.
17	Project complexity with international, different sizes, locations. How well can we support our customers with these requirements?	NA
18	How well do we undertsand or we have the information about the type of procurement strategy between EPC and end-user?	We don't understand this well. Customer procurement have their own KPI's for vendors, such as sourcing location. It is easier to do business when the KPI's are known. There are sometimes political aspects. This is really important to undestand. It is very difficult to get this information, it is usually confidential.
19/20	EPC drivers and procurement strategies.	NA

Appendix 4: Current state analysis, key-stakeholder interview #4

Topic: Current product group marketing practises for projects

Information about the interviewee (interview #4)

Name	xxxx
Position in the case company	Global oil & gas FEED sales management
Date of the interview	27.4.2015
Duration	1.5 h
Document	Field notes

Field notes (interview #1)

	Topic of the interview	**Field note summary**
0	Describe experiences in view of the topic problem	Since 1973 in various positions in service, claim handling, product management, sales and project sales.
1	Identifying opportunity What kind of people are contacted?	Customer project team (includes technical, process and procurement). Especially end-user decision makers, we are not in contact with the right people. We are not getting the information in most cases. This is one the most important topics to create the project case, when preparing ourselves to the FEED.
2	Do we put relevant information related to product group requirements?	We don't get the relevant information. We don't get enough information about the installed base and the performance of them. We don't get information about the end-user. In many cases the information is limited to EPC as direct customer. Missing some end-user contacts.
3	How well is end-user drivers understood?	We understand the technical drivers, and tend to offer over-engineered solutions. We don't understand the procurement drivers and overall customer budget.
4	How well is known project scope and investement schedule?	No understand so well the scope and investment schedule. We are lacking a global project business model. The investement value is an important indicator of the whole project scope with global aspects and potential FEED stage involvment and EPC project packages.
5	How well are our products vendor listed?	Type (a) products are fairly well listed.
6	Are relevant people involved in early FEED? Are they on time?	Our FEED group has limited resources. We need to have better support from the local sales, especially with end-users. Business line/management involment in FEED is essential to further develop.
7	How well is initial sales and product stratgey defined? How well does that fit with the FEED project technical specification requirements for vendors?	Not so well. We have certain product gaps. We should have more industry based project targets (=targetted projects) and product strategies. This suits also to support project specific requirements.
	Topic of the interview	**Field note summary**

8	When is sales project kick-off meeting held? Who participates? What is the target?	We should make the first FEED-project evaluation. Global projects is an additional challenge, when the end-user and EPC are located at different parts of the world. The FEED group resources is not enough to support this. We need to create a business model how to support this and what are the key steps to be taken.
9	How well are products vendor listed?	Not well. Product licensor recommendation is required.
10	How does system suppliers influence in product offering or strategy?	This is very important. We have technical approvals available, but we fail in giving official documents that prove those statements to EPC's.
11	How well do we succeed in getting our products listed during the FEED?	This does not work so well. Industry requires type (b) porducts (industry standard). Our type (b) is so new line of product, this requires many actions. Our competitors have type (b) that are well accepted by customers. End-user approvals are required.
12	Does our budget quotation support to avoid significant changes during the execution phase (awarded)?	This works the same way in bidder's bid, when EPC's are quoting the packages.
13	How well does the communication work between FEED players?	Answer is in 8.
14	How well does our product marketing actions and customer contacts are in line with FEED schedule?	We are often late. We get 70-80 % cases the information about the FEED from public domain, not from our direct end-user customer contacts. Direct end-user customer contacts are extremely important to succeed to be on time.
15	FEED-desing tools for optimum process flow that meet safety, operations and enviroment targets, conceptual 3-models. Are we involved here? Do we offer support for customers?	We are not involved here at the moment. This is very important for our success in product sales. Especially important to show the cost savings in customer desing.
16	Data sheets with specific requirements and standards. Are we trying to influence on these?	This depends on EPC.
17	Project complexity with international, different sizes, locations. How well can we support our customers with these requirements?	Training is required for younger generations. We have good potential with in-house engineering, but further development is required.
18	How well do we undertsand or we have the information about the type of procurement strategy between EPC and end-user?	This is very important. The procurement strategy and the way it influences the vendors. LSTK the power is with EPC, and the competitive bid is the most important. Reimbursable the end-user requirements play more important role. We should make the quotation better according to the customer procurement strategy. The procurement strategy will be defined at the late stage FEED.
19	How well do we understand the different EPC drivers in bidder's bid?	The procurement strategy is important. Secondly, the EPC's experience and perception about Metso as company, products, reporting, supply, the whole project performance. This is our strenght area. Project execution capability is an asset.
20	Procurement strategies – EPC lump sum? EPCM? How succesful with sales and product strategy.	Answer in 19

Appendix 5: Building proposal for project baseline practices

Position(s) in the case company	Product business management, Global project management, 4 people
Date(s) of the session(s)	8th, 9th and 30th June 2015
Duration of the session(s)	1.5 h / each session
Document	Field note summary

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage[1)]	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Project baseline ⇩	New production equipment[8)] Replace current supplier[8)] Buyer contacted by salesperson[8)] Evaluate the type of supplier for the project[9)]	Quantity of needed items[8)10)] Buyer team ranking items (reliability, durability, price)[8)10)] Forecast procurement planning[10)]	Supplier build good reputation[8)] Target number of suppliers[9)] Potential suppliers[10)] As precise requirements as possible for the items[10)] Iterative process via request of quotation[10)]	High quality proposals[8)10)] Presentations inspire confidence[8)] Supplier rating[8)] Identify top bidders[9)] Preliminary selection of the quotations[10)]	Awarded supplier negotiations[10)] Identify negotiation positions[10)] Final order and contract with chosen supplier[8)10)] Supplier order performance review and control. Seller should monitor the same factors.[8)10)]
No process for strategic, target project selection by industry	Current state analysis of strong industries Market demand analysis Define process for strategic project selection Result: list of focused target industries	Understand regional and end-user specific requirement development	Quote always for strategic industries Ensure up-date price lists to EPC's Address trained in-house engineers Ensure commission support	Ensure competitive pricing for selected projects Supply chain development Optimize product solutions for EPC through in-house engineering Ensure commission support	Develop change management capabilities to be able to answer customers order revisions (flexibility)
Understanding project procurement strategy		Buyer team ranking items (reliability, durability, price) Recognize the type of contracts (such as competitive FEED)	Recognize the type of customer buying center and their incentives and personal preferences, relationships, recognize decisions makers	Recognize the type of customer buying center and their incentives and personal preferences, relationships, recognize decisions makers	Site specific procurement organization Change or add-on order management
Understanding Project vendor KPI's			Procurement contacts Type of customer, location	Schedule and budget	Recognize buyers' project specific terms and conditions
Understanding project specific competitor behavior		Prevent competitor to dictate the product specs	Highlight unique product features during specification		

Appendix 6: Building proposal for timing practices

Position(s) in the case company	Product business management, Global project management, 4 people
Date(s) of the session(s)	8th, 9th and 30th June 2015
Duration of the session(s)	1.5 h / each session
Document	Field note summary

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage[1)]	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Timing	Marketer advertisement of products and services[8)]		Get listed in major directories[8)] Marketer presence in information sources and contact with buyer[8)]		
Late timing of sales actions		Recognize coming projects	Coordinate product sales activities Ensure product approvals	Coordinate product sales activities	

Appendix 7: Building proposal for product offering practices

Position(s) in the case company	Product business management, Global project management, 4 people
Date(s) of the session(s)	8th, 9th and 30th June 2015
Duration of the session(s)	1.5 h / each session
Document	Field note summary

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage[1)]	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Product offering ⇩		Marketer define buyer needs and provide value of product features[8) 9)]	Type of products[10)] Product value analysis[8) 9)] Best product characteristics specified[8)] Show a better way to make an object[8)]	List of supplier characters and their relative importance[8)] Negotiations with preferred supplier for better prices[8)] Existing suppliers of related products[9)]	Inventory management[8)] Sales and inventory information shared with key-suppliers[8)]
Project specific product offering		Product strategy defined for strategically selected industries	Avoid over-engineered product and product feature selection		
Customer / licensor approvals		Initiate product/factory approvals	Complete product/factory approvals		
Technical product gaps	Recognize the gaps and take into account in targeted projects (no go or start R&D actions)				
Marketing system integration			This should be available with clear documentation/statement from system supplier		
Support customer conceptual plant models			Easily transportable information about product measurements into the customers models In-house engineering support		

Appendix 8: Building proposal for resourcing practices

Position(s) in the case company	Product business management, Global project management, 4 people
Date(s) of the session(s)	8th, 9th, and 30th June 2015
Duration of the session(s)	1.5 h / each session
Document	Field note summary

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage[1)]	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Resourcing ⇩	Understanding the complexity and dynamics of the specific project buying behavior[11)]	Buyer needs to work with engineers, users and consultants[8)]	Sales people should be active[8)] Buyer, user and decision-maker involved[10)]	Buyer buying center[8)] Supplier development managers[8)] Sourcing locations[9)]	Good preparation of the negotiation organization and its procedure[10)]
Customer visit frequency and quality	End-user needs defined	Promote product capabilities	Global management with local sales involvement		
Global project resource support (business & product management, local sales)		Recognize projects and communicate the requirements	Nominate key-support team for strategic projects		
Lack-of manpower in early project stages			Less projects, better quality Automate routine work as much as possible (e.g. non-strategic projects, must quote cases)		
Engineering at customer premises	New/extraordinary technologies (noise, safety, emissions)	Recognize applications and opportunities with value for customer	Find the correct applications for each product types. Recognize piping challenges and cost reduction possibilities or improve safety.		

Appendix 9: Embedding strengths into project baseline practices

Strengths embedded by the researcher.

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage[1)]	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Project baseline ⇩	New production equipment[8)] Replace current supplier[8)] Buyer contacted by salesperson[8)] Evaluate the type of supplier for the project[9)]	Quantity of needed items[8)10)] Buyer team ranking items (reliability, durability, price)[8)10)] Forecast procurement planning[10)]	Supplier build good reputation[8)] Target number of suppliers[9)] Potential suppliers[10)] As precise requirements as possible for the items[10)] Iterative process via request of quotation[10)]	High quality proposals[8)10)] Presentations inspire confidence[8)] Supplier rating[8)] Identify top bidders[9)] Preliminary selection of the quotations[10)]	Awarded supplier negotiations[10)] Identify negotiation positions[10)] Final order and contract with chosen supplier[8)10)] Supplier order performance review and control. Seller should monitor the same factors.[8)10)]
No process for strategic, target project selection by industry	Current state analysis of strong industries Market demand analysis Define process for strategic project selection Result: list of focused target industries	Understand regional and end-user specific requirement development	Quote always for strategic industries Ensure up-date price lists to EPC's Address trained in-house engineers Ensure commission support	Ensure competitive pricing for selected projects Supply chain development Optimize product solutions for EPC through in-house engineering Ensure commission support	Develop change management capabilities to be able to answer customers order revisions (flexibility)
Understanding project procurement strategy		Buyer team ranking items (reliability, durability, price) Recognize the type of contracts (such as competitive FEED)	Recognize the type of customer buying center and their incentives and personal preferences, relationships, recognize decisions makers	Recognize the type of customer buying center and their incentives and personal preferences, relationships, recognize decisions makers	Site specific procurement organization Change or add-on order management
Understanding Project vendor KPI's			Procurement contacts Type of customer, location	Schedule and budget	Recognize buyers' project specific terms and conditions
Understanding project specific competitor behavior		Prevent competitor to dictate the product specs	Highlight unique product features during specification		
Project sales organizations	**Key-account and account sales teams for end-users**		**Global sales team for FEED stage**	**Global sales team supporting the local areas at execution**	**Global sales team supporting the local areas at procurement**
After sales	**Well recognized among end-users (owners)** **Supports the plant lifetime performance**				

Appendix 10: Embedding strengths into timing practices

Strengths embedded by the researcher.

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage[1)]	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Timing	Marketer advertisement of products and services[8)]		Get listed in major directories[8)] Marketer presence in information sources and contact with buyer[8)]		
Late timing of sales actions		Recognize coming projects	Coordinate product sales activities Ensure product approvals	Coordinate product sales activities	
Product approvals	**Product approval actions ongoing with key-accounts**				

Appendix 11: Embedding strengths into product offering practices

Strengths embedded by the researcher.

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage[1)]	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Product offering ⇩		Marketer define buyer needs and provide value of product features[8) 9)]	Type of products[10)] Product value analysis[8) 9)] Best product characteristics specified[8)] Show a better way to make an object[8)]	List of supplier characters and their relative importance[8)] Negotiations with preferred supplier for better prices[8)] Existing suppliers of related products[9)]	Inventory management[8)] Sales and inventory information shared with key-suppliers[8)]
Project specific product offering		Product strategy defined for strategically selected industries	Avoid over-engineered product and product feature selection		
Customer / licensor approvals		Initiate product/factory approvals	Complete product/factory approvals		
Technical product gaps	Recognize the gaps and take into account in targeted projects (no go or start R&D actions)				
Marketing system integration	**Good position with system vendors**	**Supports well specific contractor concept**	This should be available with clear documentation/statement from system supplier	**Products have excellent integration with major systems**	
Support customer conceptual plant models			Easily transportable information about products into the customers models In-house engineering support		
Product portfolio			**Large product portfolio covering majority of applications**	**Large product portfolio covering majority of applications**	**Large product portfolio covering majority of applications**
Product type A approvals	**Well approved by end-users and EPC's** **Good installed base**				

Appendix 12: Embedding strengths into resourcing practices

Strengths embedded by the researcher.

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Resourcing ⇩	Understanding the complexity and dynamics of the specific project buying behavior[11)]	Buyer needs to work with engineers, users and consultants[8)]	Sales people should be active[8)] Buyer, user and decision-maker involved[10)]	Buyer buying center[8)] Supplier development managers[8)] Sourcing locations[9)]	Good preparation of the negotiation organization and its procedure[10)]
Customer visit frequency and quality	End-user needs defined	Promote our control valve capabilities	Global management with local sales involvement		
Global project resource support (business & product management, local sales)		Recognize projects and communicate the requirements	Nominate key-support team for strategic projects		
Lack-of manpower in early project stages			Selected projects, better quality Automate routine work as much as possible (e.g. non-strategic projects, must quote cases)		
Engineering at customer premises	New/extraordinary technologies (noise, safety, emissions)	Recognize applications and opportunities with value for customer	Find the correct applications for A & B product types, and recognize piping challenges and cost reduction possibilities or improve safety	**In-house engineering team** **On-going actions at execution**	
Key-account (end-users) and account sales teams (end-users & EPC's)	**Account sales teams**		**Global sales team for FEED stage**	**Global sales team supporting the local areas at execution**	**Global sales team supporting the local areas at procurement**
After sales	**Strong global and local service and maintenance presence**			**Service centers in several locations to support customer sourcing**	

Appendix 13: Feedback for proposed project baseline practices

Position(s) in the case company	Product business management, Global project management, 4 people
Date(s) of the session(s)	13th and 14th August 2015
Duration of the session(s)	1 h / each session
Document	Field note summary, ***feedback highlighted*** in matrix

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage	1 Problem recognition[8)] 2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]	
Project baseline ⇩	New production equipment[8)] Replace current supplier[8)] Buyer contacted by salesperson[8)] Evaluate the type of supplier for the project[9)]	Quantity of needed items[8)10)] Buyer team ranking items (reliability, durability, price)[8)10)] Forecast procurement planning[10)]	Supplier build good reputation[8)] Target number of suppliers[9)] Potential suppliers[10)] As precise requirements as possible for the items[10)] Iterative process via request of quotation[10)]	High quality proposals[8)10)] Presentations inspire confidence[8)] Supplier rating[8)] Identify top bidders[9)] Preliminary selection of the quotations[10)]	Awarded supplier negotiations[10)] Identify negotiation positions[10)] Final order and contract with chosen supplier[8)10)] Supplier order performance review and control. Seller should monitor the same factors.[8)10)]
No process for strategic, target project selection by industry	Current state analysis of strong industries for product group Market demand analysis ***Define criteria*** for strategic project selection Result: list of focused target industries	Understand regional and end-user specific requirement development	Quote always for strategic industries Ensure up-date price lists to EPC's Address trained in-house engineers Ensure commission support	Ensure competitive pricing for selected projects Supply chain development Optimize solutions for EPC through in-house engineering Ensure commission support	Develop change management capabilities to be able to answer customers order revisions (flexibility)
Understanding project procurement strategy		Buyer team ranking items (reliability, durability, price) ***Recognize the type of contracts*** (such as competitive FEED)	Recognize the type of customer buying center and their incentives and personal preferences, relationships, ***recognize decisions makers***	Recognize the type of customer buying center and their incentives and personal preferences, relationships, ***recognize decisions makers***	Site specific procurement organization (different people compared to FEED and execution) change or add-on order management
Understanding Project vendor KPI's			Procurement contacts Type of customer, location	Schedule and budget	Recognize buyers' project specific terms and conditions (i.e. penalties and liabilities)
Understanding project specific competitor behavior		Prevent competitor to dictate the product specs	Highlight unique product features during specification		
Account sales and ***quotation*** teams	Key-account and account sales teams for end-users		Global teams for FEED stage	Global teams supporting the local areas at execution	Global teams supporting the local areas at procurement
After sales	Well recognized among end-users (owners) Supports the plant lifetime performance			***Strong global and local service and maintenance presence***	***Product execution and start-up service capabilities for large delivery projects***

Appendix 14: Feedback for proposed timing practices

Position(s) in the case company	Product business management, Global project management, 4 people
Date(s) of the session(s)	13th and 14th August 2015
Duration of the session(s)	1 h / each session
Document	Field note summary, ***feedback highlighted*** in matrix

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage[1)]	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Timing	Marketer advertisement of products and services[8)]		Get listed in major directories[8)] Marketer presence in information sources and contact with buyer[8)]		
Late timing of sales actions		Recognize coming projects	***Plan*** product sales activities during FEED Ensure product approvals	Coordinate product sales activities	
Product approvals	Product approval actions on-going with key-accounts				

Appendix 15: Feedback for proposed product offering practices

Position(s) in the case company	Product business management, Global project management, 4 people
Date(s) of the session(s)	13th and 14th August 2015
Duration of the session(s)	1 h / each session
Document	Field note summary, ***feedback highlighted*** in matrix

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage[1)]	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Product offering ⇩		Marketer define buyer needs and provide value of product features[8) 9)]	Type of products[10)] Product value analysis[8) 9)] Best product characteristics specified[8)] Show a better way to make an object[8)]	List of supplier characters and their relative importance[8)] Negotiations with preferred supplier for better prices[8)] Existing suppliers of related products[9)]	Inventory management[8)] Sales and inventory information shared with key-suppliers[8)]
Project specific product offering		Product strategy defined for strategically selected projects	***Ensure competitive product selection and pricing for budgetary bidding***	***Avoid over-engineered product and product feature selection***	
Customer / licensor approvals	***Initiate product /factory approvals***	***Complete product /factory approvals***	***Ensure product /factory approvals available***		
Technical product gaps	Recognize the gaps and take into account in targeted projects (no go or start R&D actions)				
System integration	Good position with system vendors	Supports specific contractor concept	This should be available with clear documentation/statement from system supplier	Products have excellent integration with major systems	
Support customer conceptual plant models			Easily transportable information about valve measurements into the customers models In-house engineering support		
Product portfolio			Large product portfolio covering majority of applications	Large product portfolio covering majority of applications	Large product portfolio covering majority of applications
Product type A approvals	Well approved by end-users and EPC's ***Good installed base***				

Appendix 16: Feedback for proposed resourcing practices

Position(s) in the case company	Product business management, Global project management, 4 people
Date(s) of the session(s)	13th and 14th August 2015
Duration of the session(s)	1 h / each session
Document	Field note summary, ***feedback highlighted*** in matrix

Project stage	Business plan[1) 7)] (Owner)	Feasibility[1) 3) 4) 5) 6)] (Engineering)	FEED[1) 2) 3) 4) 5) 6)] (Engineering)	Execution[1) 2) 3) 4) 5) 6)] (Engineering)	Procurement[1) 2) 3) 4) 5) 6)] (Engineering)
Business buying process stage[1)]	1 Problem recognition[8)]	2 General need description[8)]	3 Product specification[8)] 4 Supplier search[8)]	5 Proposals[8)] 6 Supplier selection[8)]	7 Order-routine[8)] 8 Performance review[8)]
Resourcing ⇩	Understanding the complexity and dynamics of the specific project buying behavior[11)]	Buyer needs to work with engineers, users and consultants[8)]	Sales people should be active[9)] Buyer, user and decision-maker involved[10)]	Buyer buying center[8)] Supplier development managers[8)] Sourcing locations[9)]	Good preparation of the negotiation organization and its procedure[10)]
Customer visit frequency and quality	End-user needs defined	Promote our control valve capabilities	Global management with local sales involvement		
Global project resource support (business & product management, local sales)		Recognize projects and communicate the requirements	***Align*** and nominate key-support team for focused projects		
Lack-of manpower in early project stages		***Re-define local sales teams KPI's for projects***	Selected projects, better quality Automate routine work as much as possible (e.g. non-strategic projects, must quote cases)		
Engineering at customer premises	New/extraordinary technologies (noise, safety, emissions)	***Recognize applications*** and opportunities with value for customer	***Engineering actions:*** Find the correct applications for A & B product types, recognize piping challenges and cost reduction possibilities or improve safety	In-house engineering team On-going actions at execution	
Account sales and ***quotation*** teams	***Global teams supporting the local areas and approvals***		Global teams for FEED stage	Global teams supporting the local areas at execution	Global teams supporting the local areas at procurement